The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXV. No. 644 OCTOBER 31, 1931 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.6.0

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street. London, E.C.4), are closed on Saturdays.*

Telegrams: "Allangas, Fleet, London." **Telephone:** City 024

The National Verdict

THE response of the nation to the challenge of the Trade Union pontiffs has been magnificent, beyond all expectations. The quietness and deliberation with which the duty has been discharged is not its least impressive feature. Simultaneously, spontaneously, in every part of the country, in every sort of constituency, the electors went to the poll to register their votes for national unity and against class warfare and sectionalism. Conservatives, Liberals, and the best elements in Labour itself joined forces. The results of their action demonstrate to the world what this country is still made of. The so-called Labour leaders, who missed the greatest opportunity of serving their country that will ever come to them, have been submerged by a tidal wave of national contempt and indignation. Their Parliamentary supporters who survive are a negligible remnant. The gentlemen behind the scenes, who were bent on enforcing their sovereign will on resilient Ministers of the Crown, have something to think about. So have the ignorant agents of mischief whose only pretence to work is spreading discontent and class hatred in the workshops. It is a triumph for national sanity. Nothing so devastating, so final and decisive, has ever happened in this country since Parliamentary Government began. The world will now understand once more the spirit of the British race when it is roused to do its duty.

For the great trading community at home the General Election offers new prospects and fresh hopes. There is the guarantee of four or five years of practical, level-headed government with the nightmare of the abyss definitely removed. A tremendous responsibility rests upon the national statesmen, and there is general recognition of the completely adequate manner in which so far they have risen to the height of their opportunity. It has yet to be proved that they have entirely discarded the unsound political theories which brought us to the brink of ruin. The aggregate vote is a protest against doles, bribes, officials, committees, and the entire paraphernalia of the Socialist state. It reveals in a flash the disgust of the decent Englishman with the fetters with which he has been bound, his hatred of public extravagance, his craving for honest work rather than State charity, and his ambition that his home may once more be his castle and not a regulated hostel in which the only employment would consist of filling up official forms. At this priceless moment the nation may well be far in advance of its leaders.

For the first time in living memory here is something like a clean sheet for the politicians to write upon. The instinct with most people would be that the less writing that appears on the sheet the better. Elaborate programmes for new legislation are a confessed failure. The period immediately ahead is not one for great Parliamentary achievement. If it is to be used as the nation obviously intends, it should be a period of careful administration directed to two outstanding purposes, the restoration of Great Britain in an unassailable economic position, and the removal of the wasteful and irritating restrictions that fetter and destroy the soul of the workman. Everything is ripe for the development of political policy on the traditional but lately discarded principles of liberty and order. The conviction that the electorate has shown in the future destiny of the country is the surest stimulant to that confidence which the business man so badly needs. Bold and yet prudent leadership can quickly make that confidence secure, and in a measurable distance of time, as the direct result of the polls declared this week, British trade may resume its forward march and lead the world back to prosperity.

The Platinum Agreement

THE international agreement for the regulation of the marketing of platinum, announced in our last issue, is a matter of considerable interest to the chemical industry, which is interested in the production of this fine metal and also provides many uses for it. The company is to be an English one, consisting of representatives of the principal producers, and it is of interest to note that Russia, where platinum is found in the natural state, is co-operating in this scheme with "capitalists" of other countries. One of the main

objects of the new organisation is the promotion of the use of platinum through an extensive research and development programme, and no doubt regard will be paid to the stabilisation of the price. In New York the price within two years has varied as widely as from $60 to $25 an ounce and at present it is in the neighbourhood of $37 to $38. This is regarded as a reasonable figure and it is hoped to keep the price at about this level and so avoid the ill-effects of violent fluctuations. This country is particularly interested in the scheme on account of the Mond Nickel Co. and the International Nickel Co. of Canada, through which it controls a large part of the production. The Acton refinery of the Mond Nickel Co. produces about 80,000 ounces of platinum a year, and the recent enlargement of the plant will enable it to deal with 300,000 ounces, about three-fourths of the total world demand.

Although platinum is popularly associated with jewellery, as it makes such an attractive and satisfactory setting, it has many industrial uses. These mainly depend on the extremely high melting point of the metal and on its immunity from attack by most chemical reagents. Laboratory equipment, such as crucibles, dishes, spatulas, electrodes, wire and other equipment, has long been made from platinum. There are few laboratories to-day that do not possess some platinum equipment. Platinum, alloyed with 10 to 25 per cent. of iridium, is extensively used. in the electrical industry. Uses of platinum as a catalyst in the production of sulphuric acid by the contact process, and of nitric acid by the oxidation of ammonia, are very important industrially. A more efficient catalyst having a longer life has recently been developed for the latter process by substituting a platinum-rhodium alloy for the pure metal. Platinum alloyed with gold is used in the viscose process for the manufacture of artificial silk. It has been found that platinum-gold spinnerets are far less subject to corrosion than those made of any other metal or alloy. These are merely examples of its special suitability for many chemical processes.

The Importance of Filtration

FILTRATION plays an important rôle in nearly all manufacturing processes where chemicals are in use, so much so that it can be considered a distinct branch of chemical engineering. The ultimate objects to be achieved may be roughly divided into two groups—the separation of large volumes of solids from a relatively small volume of liquid, the filtration unit being equipped to recover the solid matter and discharge it in a semi-dry condition, or alternatively, the removal of small amounts of solid matter present in large volumes of liquid where this matter is regarded as a decided impurity or renders the liquid unsuitable for use. In the latter case the solids are discharged as a kind of muddy backwater. Among the appliances in use the filter press still holds its own, for in many cases it is indispensable. Leaf filters, equipped with non-collapsible bags inserted in a shell, working under vacuum or under pressure, are being increasingly used. Still greater development is noticeable in continuous rotary vacuum filtration, where very large volumes of liquor have to be handled as with the case of waste liquors from manufacturing or processing operations. The speeding up of filtration processes has been the chief trend of development, even in the case of raw water supplies where the rapid filters now in use are nearly fifty times as speedy as the old slow sand filter. Some of the firms, whose productions are mentioned in this issue have for many years devoted themselves to the solution of the major filtration problems, and the efficiency of the modern plant which they produce is a tribute to their labours.

The Dyestuffs Position

MR. W. J. U. WOOLCOCK, who has been so closely associated with the working of the Dyestuffs Act since it was passed nearly eleven years ago, reviewed the whole position with admirable clearness in his address last week to the London Section of the Society of Dyers and Colourists. About this time last year people were eagerly debating whether the Act was to be renewed or not. The feeble and helpless way in which the Labour Ministers concerned handled the matter alienated a good deal of sympathy from them and exhibited an astonishing lack of understanding of the science point of view. The question of the renewal of the Act will again arise at the end of this year in greatly altered circumstances, and Mr. Woolcock's review of the situation will materially help towards a clear understanding on the parts of makers and users.

Such protection as the Act has afforded—and it has been sufficiently effective to allow the industry to be re-established at a minimum of sacrifice to the users—has been obtained under a system of regulation of licences to import foreign dyes. The return of a National Government pledged to consider tariffs as one of the means of assisting British industry may possibly result in a demand for a tariff policy in connection with dyestuffs. In such circumstances the users may, and probably will, think the existing system far preferable, although it does not completely meet their views, and if they and the makers were able to agree on a considered policy there would be a good prospect of obtaining the assent of any new Government.

Books Received

PAPER TESTING AND CHEMISTRY FOR PRINTERS. By Gordon A. Jahans. London: Sir Isaac Pitman and Sons, Ltd. Pp. 314. 12s. 6d.

FINAL REPORT ON THE THIRD CENSUS OF PRODUCTION OF THE UNITED KINGDOM (1924). London: H.M. Stationery Office. Pp. 468. 7s.

The Calendar

November	2	Society of Chemical Industry (London Section): "The Saccharification of Wood." Dr. H. A. Auden and Dr. W. P. Joshua. 8 p.m.	Burlington House, London.
	2	Hull Chemical and Engineering Society and Society of Chemical Industry (Yorkshire Section): "Emulsions." A. H. Dodd, J. Pryce Jones, A. N. Mosses. 6.45 p.m.	Station Hotel, York.
	3	Mineralogical Society: Anniversary Meeting, 5.30 p.m.	Burlington House, London.
	3	Oil Industries Club: "Oil from Coal": K. Gordon (Imperial Chemical Industries, Ltd.)	Abercorn Rooms, London.
	4	Society of Public Analysts. 8 p.m.	Burlington House, London.
	5	Diesel Engine Users' Association: "The Elimination of Vibration." R. B. Grey.	Caxton Hall, London.

A New High Pressure Filter

By J. A. Pickard

The following article describes a new high pressure filter working on the metafilter principle. It is free from many disadvantages present in other high pressure filters, chiefly the marked tendency to leak and liability for the filtering medium to break down under the pressure employed.

THE need for a filter capable of working under high pressures is felt in two ways. First there is a demand for a filter which will operate when the whole system—both filtrate and prefilt—is under high pressure; and, secondly, there is a greater demand still for a filter which will permit of a very high difference of pressure between the feed and delivery ends.

In filters for high pressure systems the effective working pressure through the filtration surface may in most cases be comparable with what exists in ordinary filtrations in the open atmosphere, and the main requirement is to provide sufficient strength in the actual container and pipes, and to avoid leaks, without paying special attention to the filtration medium itself. Hydrogenation and cracking of oils, and some organic synthetic manufactures provide fields for the use of filters of this type. Filters in which a very high feed pressure, without a corresponding high delivery pressure, is desirable are of use chiefly in dealing with very viscous slow-flowing liquids where the use of the high pressure limits high, or at any rate reasonable, outputs to be obtained from filters of fairly small filtering surface. The high feed pressure compensates for the viscosity, and may avoid any necessity to overcome the viscosity by heat or by dilution. This is sometimes of special advantage in dealing with oils, which may contain sludges or precipitates which redissolve on heating; or may tend to suffer decomposition at the higher temperature. In other cases, such as dopes and varnishes, there is practically no alternative to dealing with them under conditions where the viscosity is maintained.

FIG. 1. NEW HIGH PRESSURE METAFILTER.

Disadvantages Avoided

The filters which are about to be described are available for use in both these cases, and are free from many of the disadvantages inherent in other types. The disadvantages which they avoid are mainly a marked tendency to leak—this is specially exemplified in filter presses with their innumerable joints round the edges of the plates; and a liability of the filter medium itself to break down under high pressure, which may result in complete failure of the whole operation, or, at the best, contamination of the filtrate with material which has passed through. A minor disadvantage of existing types is the very limited choice of materials of construction—which is practically confined to steel and cast iron. The large amounts of material necessary to construct a filter press, for instance, soon make the cost prohibitive if copper or stainless steel be used. Emptying and cleaning, also, is usually a lengthy and unpleasant operation.

Filtration Principle Employed

It is clear that the principle employed in metafilters, of filtering through a renewable filter-bed supported by a rigid substructure, has great possibilities in overcoming these difficulties when properly applied. A type of metafilter bed support is shown in Fig. 2 which has been found convenient to produce, and is susceptible of adaptation to a variety of conditions. It will be seen that the support consists of a number of rings of two kinds—plain and embossed—mounted on a central fluted rod which provides internal drainage channels. The embossments are made with extreme accuracy, and the interposed plain rings are perfectly flat, so that the separation between any pair of rings is precisely identical, so that the assembly provides a uniform and very substantial porous basis for the superimposed filtering bed. To provide a suitably robust container to utilise these properties was not a very difficult matter, and a typical filter is shown in Fig. 1.

The filter consists essentially of three parts—the filter body; the head; and a dividing plate carrying the actual filtering elements. Of these it is only strictly necessary to construct the body and dividing plate of sufficient strength to withstand the pressure where the filter is delivering at atmospheric pressure. But it is desirable that the head also should be equally strong even in this case, as in the event of the delivery cock being turned off while the filter is operating the full pressure will soon be communicated to the delivery side. In the filter shown the number of filter packs is made as high as possible by disposing them in plan very close together. This provides for a very large filtering surface contained in a small bulk, and is particularly useful in cases where the actual amount of matter to be removed is small and of a slimy, clogging nature so that the cakes built up are not very thick.

On account of the small bulk of the filter, it is economical when dealing with relatively valuable liquids. The head volume is made as small as possible, so that the flow of liquid through it may be rapid, and the washing away of any turbid first runnings facilitated. The body, head and dividing plate are bolted together round the flange. The joint between the body and plate is made by a spigot seated on an annular hard fibre washer. This can be repeatedly broken and remade without loss of efficiency. The joint between the head and dividing plate may be the same or of a more permanent nature as, in use, it is unnecessary to break it.

Method of Operation

In operation the first step is to deposit the filtering bed on the packs. This is accomplished by mixing the required amount of bed-forming material with a sufficiency of unfiltered liquid and pumping through the filter entering at the bottom—returning the first runnings to the pump.

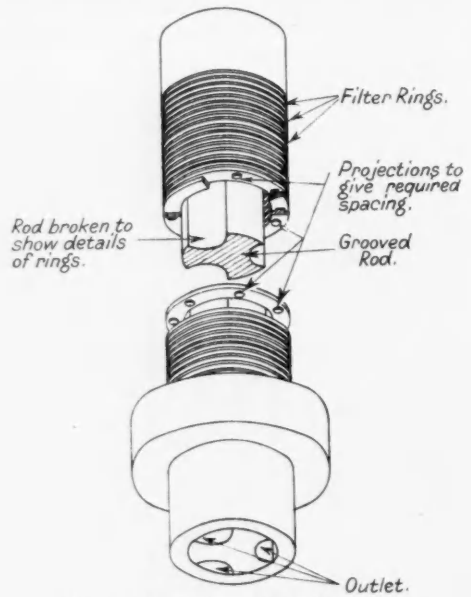


FIG. 2. THE METAFILTER RING PACK.

When the bed is formed and the filtrate is running perfectly clear the main bulk of the liquid is passed through and no breakdown of the bed takes place, even when feed pressures of 200 lb. per square inch and higher are employed. When the whole quantity has been filtered the cleaning operation is carried out. The filter body is first emptied of unfiltered liquid; then the nuts attaching the head, plate, and packs to the body are removed, and the head, carrying with it the plate and packs lifted out by a small tackle. The assembly is then transported to one side of the filter, a tray to receive the cakes placed below, and compressed air admitted to the head. The cakes are thereby detached from the filter packs and slide cleanly off into the tray, being lubricated to slide off easily by the small amount of filtrate which is forced back through the elements by the air. The assembly is then returned to the filter body and the nuts retightened, the whole operation having occupied only a few minutes.

The above filter is designed for permanent factory use, but in some cases it is more convenient to employ portable filters. An outfit of this type is shown in Fig. 3, which comprises in itself a self-contained filtering plant for high pressures. This filter is constructed on the same lines as the preceding one, except that in this case the head and packs are not intended to be removed for cleaning. The filter is provided with a swing-out bottom cover, and the sludge and filter bed is detached by reverse flow and caught in a receptacle placed below. The operation of the filter is on the same lines as before, but the unfiltered liquid is delivered to a small tank in which it rises to a level controlled by a ball valve. The filter bed material is mixed with the liquid in the tank by means of a stirrer which is provided, and the mixture is then withdrawn and delivered to the filter by a ram pump driven by an electric motor which forms part of the equipment. The first runnings are returned to the tank until clear, after which the filtrate is delivered away by a separate pipe, unfiltered liquid automatically following on and maintaining the supply tank full. In this filter a device is incorporated for adding a further quantity of filter bed material to the liquid undergoing filtration, automatically adjusted to the quantity passing. In this way the clogging effect of slimy sludges is in great measure counteracted, and much larger quantities can be dealt with without cleaning.

Filters of the foregoing types can be built up to almost any size and output, and may be constructed in practically any material which can be cold worked. Mild steel, brass, monel metal and stainless steel are among the most usually employed metals, but a large variety is available suitable for use with almost any liquid. Their simplicity of operation, combined with absence of wear or need for renewals, and their compactness, render them extremely convenient for use in directions where previously filtration has been difficult or impossible.

Increasing Efficiency in Water Filtration

Bell Bros., (Manchester) Ltd.

DURING recent years the system of rapid mechanical water filtration has been widely adopted by important water works authorities and large industrial concerns throughout the world. This universal success of the mechanical pressure filter is the direct result of extensive scientific research. The firm of Bell Brothers (Manchester 1927), Ltd., of Denton, near Manchester, have played a leading part in the conduct of this research, and have been responsible for the installation of mechanical filtration plant in all parts of the world.

The chief point in any filtration plant is the method used for washing the filtering medium. It is claimed that in the "Bell" filter, the method of washing produces the highest possible efficiency, and brings the filter-bed back to its original clean state. The method used is to, first of all put the bed into suspension by a reverse flow of water, and then to thoroughly break up and stir the whole of the bed by means of the revolving arms, to the ends of which are attached rakes which in their turn scrape off all the sand, which tends to adhere to the sides of the filter shell. Whilst the arms are revolving a strong current of water is forced down the hollow shaft holding the arms, and out through small valves located in the back of the arms. These jets of water, together with the peggy-leg action of the revolving arms, thoroughly scour every particle of sand, and the dirt so loosened is carried away by the reverse flow of water. This operation only occupies from 2 to 5 minutes per filter, and thus ensures the minimum of interference with continuous filtration. It should also be noted that only filtered water is used for washing the filter-bed.

The bacteriological purity of any water liable to pollution can now be ensured at almost negligible cost by the Bell chlorinating plant. In comparatively few cases is it necessary to use more than three pounds of chlorine to one million gallons of water. Calculated on this ratio, the total cost of treatment by the Bell plant is extremely low. The amount of chlorine added to water is under very fine control. Apart from periodical examination, adjustment of the gas supply, and changing of the cylinders, the plant requires practically no attention.

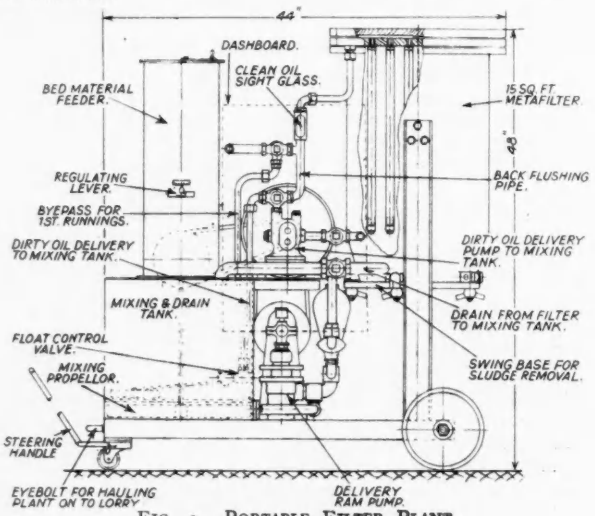
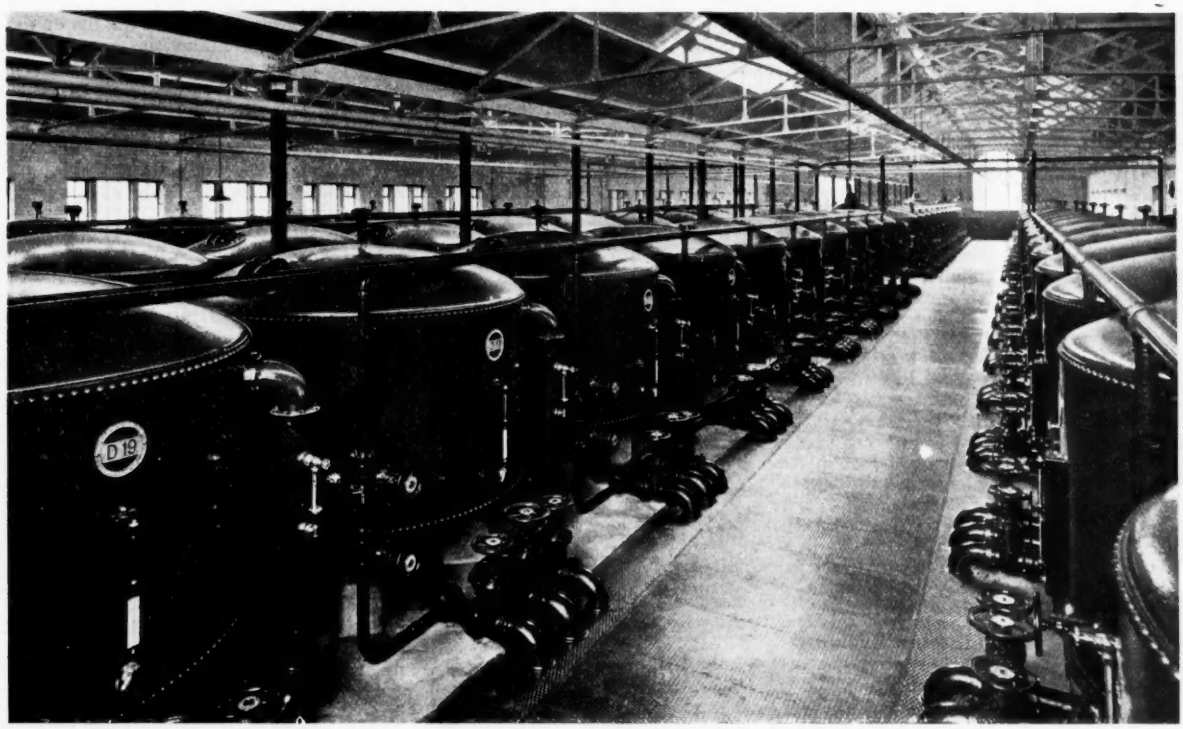


FIG. 3. PORTABLE FILTER PLANT.
(METAFILTER PRINCIPLE).



BATTERY OF "PATERSON" PRESSURE FILTERS AT HALIFAX WATER WORKS. (TOTAL CAPACITY 12,000,000 GALLONS PER DAY.)

The Filtration of Raw Water

Modern Practice Exemplified by Recent Installations

The following article incorporates a description of water filtration plant recently completed by The Paterson Engineering Co., Ltd., of London. The plant supplied for the County Borough of Halifax is the largest of its type in the world, and is now dealing with 12,000,000 gallons of water per day.

THE treatment of raw water supplies for the removal of suspended matter has been the subject of constant experiment for many years. In most cases a coagulant has to be added to assist the filtration process, for straining through sand merely arrests the grosser impurities, whilst colour, clay and very fine suspended matter passes through freely until the filter has become "filmed." Single units for rapid sand filtration are now produced with capacities up to two million gallons per 24 hours. Such filters can be of the gravity type or the pressure type, the pressure type being so named because it can be interposed on a pressure main without breaking the hydraulic gradient and without the necessity for re-pumping.

The accompanying illustration shows one of the most recent installations working on the pressure system, completed by The Paterson Engineering Co., Ltd., in March, 1931, for the County Borough of Halifax. This pressure filtration plant is designed to deal with a maximum of 12,000,000 gallons per day. It comprises (a) the necessary chemical preparing and measuring gear for the application to the water of suitable quantities of reagents for coagulating the impurities, removing the colour and neutralising the natural acidity; (b) eighty-four pressure filter units, each 9 ft. diameter, giving a total filtering area of 5,340 square feet, all connected to the common raw water inlet main and to the pure water outlet main and cleansed by compressed air agitation, and (c) laboratory and office for the control of the filtration plant and storerooms for the reagents employed in the purification process.

Coagulating the Impurities

The sulphate of alumina and lime are automatically proportioned to the water, so that once the required dose has been established and adjusted the reagents are added at this precise rate in exact proportion to any variations in the flow of water to be treated. This flow is measured by a Venturi meter, which, in addition to giving a continuous record of the rate of flow of water through the plant, also serves to actuate a mercurial differential gear. This operates a multi-stage rheostat regulating the current supplied to a variable speed electric motor, in such a manner that the speed of the motor is proportionate to the volume of water to be treated. The motor is employed to drive chemical proportioning pumps, which inject the required quantity of coagulant and lime into the raw water in its passage along the inlet main to the filter house. The chemical reagent pumps are of the plunger type and means are provided so that immediate adjustment can be effected of the reagent dose to compensate for variations in the nature of the raw water, thus ensuring at all times accurate and efficient treatment.

The sulphate of alumina solution is prepared and stored in two ferro-concrete tanks provided with suitable agitators to ensure the proper mixing of the solution. From these tanks the solution is drawn by the reagent pumps and delivered into the raw water main at the required rate. The lime cream is prepared in two horizontal storage tanks fitted with efficient agitators, continuously rotating to prevent settlement of the lime. The lime injection pumps draw their supplies from these tanks and are arranged to deliver the required quantity of this reagent both before and after filtration. Each filter unit is independently connected to the raw water inlet and pure water outlet mains and fitted with inlet and outlet valves. In addition each filter is fitted with an air valve connected to the compressed air supply, a by-pass valve and a waste valve discharging into the drain channel.

The Pressure Filter Units

The raw water, after being treated with alumina, enters the filter by means of a centrally placed trumpet pipe of large diameter so that its flow causes no disturbance of the sand bed, nor of the filtering film formed thereon. The water is

filtered in its passage through the sand bed, from beneath which it is collected by the strainer system, consisting of a large number of heavy copper pipes each having small apertures or nozzles, so arranged as to ensure perfectly an even draw-off of filtered water from the whole area of the bed. The deposition of the intercepted impurities on the surface of the filter bed gradually increases until the point is reached when it becomes necessary to cleanse the filter.

This cleansing is effected in a simple and efficient manner by thoroughly agitating the filtering medium for about two minutes with compressed air admitted through the distributing system below the filter, the whole of the sand bed being broken up and the impurities thereby loosened. A reverse current of filtered wash water, immediately following the air agitation, floats the loosened impurities into the central bell-mouth waste pipe, through the waste valve and into the drain channel formed below the centre gangway of the filter house. Each filter unit is thus cleansed and recommences work within a few minutes, and by means of the by-pass valve, the filtered water can, when necessary, be run to waste for the first few minutes, until the filtering film is re-formed on the surface of the bed. The method of distributing the air and wash water ensures uniform and efficient agitation and aeration of the entire filtering mass. The special arrangement of air vents, which is a characteristic feature of the Paterson system, ensures the expulsion of all air from the distributing system after the wash water is admitted, so that agitation continues up to the moment of flotation of the loosened impurities into the waste pipe.

Filtering Medium

The filtering medium consists of specially graded Leighton Buzzard sand supported on graduated layers of pebbles, ranging in size from grit to large stones. Each filter unit is equipped with a continuously operating visible flow meter which shows the filtering rate of flow at all times when the unit is in commission; indicates to the attendant—when the rate falls—that the filter bed requires cleansing; and also shows the rate of wash water being applied to the bed during cleansing, and so ensure an efficient and yet not too violent flushing. To enable the attendant at all times to keep a check on the operation of the plant a control stand is arranged in the main gangway, on which are mounted gauges to show the pressure in the raw water and pure water mains with similar gauges for each filter battery. In addition this stand carries clarity indicator bowls to give at all times a direct comparison between the raw and filtered water from each battery. The waste water passes over a weir in a measuring tank outside the filter house, recorded by means of a Paterson fluxograph, and is then conveyed to the main sewer.

A rapid gravity filtration plant of 48,000,000 gallons daily capacity, has been installed by the Metropolitan Water Board at their Kempton Park Works. This installation consists of twenty-four open type rapid filters, twelve being arranged on each side of a central tower building at the head of which the necessary supplies of filtered water and compressed air are stored for cleansing purposes. Each filter discharges into an outlet inspection chamber communicating with a central pure water trough taking the combined filtrate from the twenty-four units.

This installation is the latest development of the Metropolitan Water Board's practice of what is called "double filtration," i.e., primary filtration through filters of the rapid gravity type operated at rates varying between 100 and 200 gallons per square foot per hour, followed by final passage of the water through slow sand filters, which, when dealing with the rapid filtered water, can be operated at a speed very considerably in excess of that permissible when the entire purification has to be effected by slow sand filters alone. The final filtered water is sterilised by the chloramine process consisting in the application of minute quantities of ammonia and gaseous chlorine administered by the Paterson chloronome.

Purification of Industrial Supplies

A very interesting example of the use of modern water purification plant in industry is the recent installation completed for the new mills of St. Anne's Board Mill Co. at Bristol. This company are producers of high grade board used for the manufacture of cigarette packets and cartons of all descriptions. For their process purposes it is essential to have available a plentiful water supply of a quality equivalent to that distributed by public authorities for drinking purposes. The supply to the new mills obtained from the river Avon is at times very heavily charged with suspended matter and other impurities, and equipment has been installed by the Paterson Engineering Co. for the conversion of this into a completely satisfactory water of a high degree of purity. The process consists in the addition of a coagulant (sulphate of alumina) before the water flows into sedimentation tanks of special design provided with means for continuous abstraction of the settled impurities. The partially clarified water then flows on to a battery of four rapid gravity filters of the standard Paterson air-cleansed design exactly similar in all respects to the many installations supplied to public water authorities in all parts of Great Britain and overseas. The installation referred to is arranged for dealing with a maximum output of 4,000,000 gallons per day.

The latest development in industrial water purification is the decision of the London, Midland and Scottish Railway Co. to embark on an extensive programme of water softening at a large number of stations on the main North Western and Midland lines for the treatment of locomotive boiler feed supplies. After very careful investigation this contract has been awarded to the Paterson Engineering Co. for a chain of sixteen plants, with capacities ranging up to 30,000 gallons per hour. In each case, arrangements are provided for the addition of softening reagents to the crude water before its passage through reaction and precipitation tanks, which are of the vertical cylindrical design. The softened water is finally to be purified by filtration through air-cleansed pressure filters, similar in all respects to those used for potable water treatment.

Simon-Carves, Ltd.

Application for Reducing Capital Confirmed

In the Manchester Chancery Court on Monday, October 26, the Vice-Chancellor (Sir Courthope Wilson, K.C.) heard a petition in which Simon-Carves, Ltd., asked for confirmation of a reduction of capital from £400,000 to £286,325.

Mr. F. J. Kerr, instructed by Messrs. Slater, Heelis and Co., appeared for the company, which has its works at Cheadle Heath and its registered office at 69 Princess Street, Manchester. He said it was incorporated in 1896 to carry on the business of erectors or users of plant for the carbonisation of coal according to the methods known as the Simon-Carves principle. The original capital was £100,000, and the company was known as the "Simon-Carves Bye-Product Oven Construction and Working Company, Ltd." In 1907 the capital was increased to £400,000 in £1 shares, all issued and fully paid except 72,650 pre-preference shares, and in 1916 the name of the company was changed to its present title.

Large profits had been earned. The balance-sheet taken on December 31, 1930, showed assets valued at £667,132, of which £61,000 was invested in subsidiary companies and £266,908 in other investments. The paid-up capital exceeded the wants of the company by more than £113,675. Premises in Mount Street taken in the balance-sheet at £48,000, the cost, had been sold for £100,000. It was proposed out of the proceeds of certain investments or cash at the bank to repay 10s. per share to the holders of the 227,350 pre-preference shares, reduce the shares to 10s., and afterwards consolidate them into 113,676 £1 shares. The capital would then be £286,325 in £1 shares, divided into 186,325 pre-preference shares (113,676 issued and fully paid), 65,000 preference shares, and 35,000 deferred shares.

The Vice-Chancellor confirmed the reduction.

£20,000 Order from Copenhagen

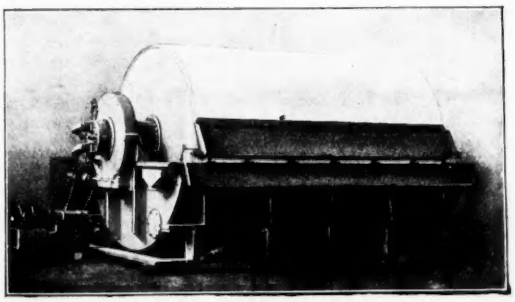
Hopkinsons, Ltd., Britannia Works, Huddersfield, have through their agent, Mr. Soren Hogh, of Copenhagen, received a complete order for boiler mountings, including their new high lift safety valves, for eight Sterling boilers for the Copenhagen Municipal Lighting Department. Each boiler is specified to the capacity of 50 tons evaporation per hour. The order specifications further include most of the high pressure valves for the pipe lines. The more important main stop valves will all be electrically operated. The whole contract will run to about £20,000.

Some Phases of the Filtration Problem

Thickeners, Rotary Vacuum Filters and Pressure Filters

The present industrial crisis calling for economic plant operation is a suitable time to focus attention upon the question of filtration, which is an important stage existing in nearly every industrial process. The following article has been specially contributed by Oliver United Filters, Ltd., who have developed a range of filters to meet the varying filtration problems encountered in the industrial field.

THOUGH the definition of "filtration"—the separation of solid from liquid—is concise and to the point, in practice this particular operation is often one of the most difficult problems arising in production, the solution of which can only be



OLIVER CONTINUOUS ROTARY VACUUM FILTER.

obtained by careful study of the following point. What *type* of filtration equipment is best suited to the particular problem?

Many materials are amenable to vacuum filtration, others require higher pressure than that obtainable under barometric conditions, and yet others require still higher pressure. Under these conditions, when considering the installation of filtration equipment, it is necessary to order to get unbiassed advice as to the particular type of filter to give greatest economy and most satisfactory operating results to obtain the advice of a manufacturer building a complete range of filtration equipment. From a purely manufacturing standpoint it might be more profitable to build one type of machine only, to be sold for all purposes, but it is our conviction that such a policy would not be in the best interests of our customers. But no single type of filter has yet been designed that is equally suited to the many different and widely varying filtration problems encountered in the industrial field. It is this fact that has led to the development of separate and distinct types of filtration equipment such as thickener, rotary vacuum filters, and pressure filters, each of which have their own particular range of application.

Thickeners

The purpose of a thickening device is to eliminate the greater part of the liquid from mixtures containing relatively only a small amount of solids, thus concentrating the solids in the pulp. This may be effected by either of the following methods (a) by settlement in a "gravity" type of thickener, or (b) by elimination of the greater part of the fluid by means of filtration. In this latter class are the Oliver Borden and the Sweetland thickeners which are manufactured with filter arease from 208 to 832 sq. ft., and are used extensively in the beet sugar industry, many chemical fields, and for effluent clarification problems. It is often possible by a combination of a thickener unit followed by a rotary vacuum filter to convert a filtration problem which hitherto has been an intermittent process into a continuous operation.

Rotary Vacuum Filters

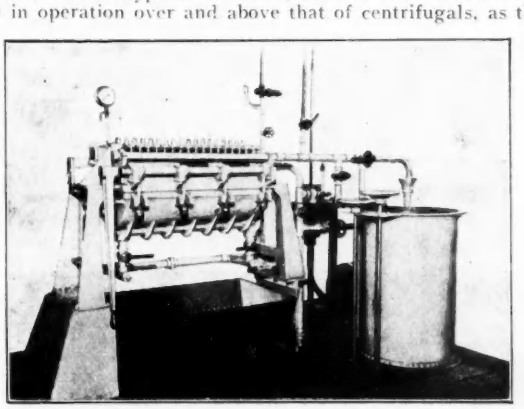
Generally speaking vacuum filters are most successfully employed for the filtration and washing of products containing a reasonably large percentage of fairly free filtering suspended solids. The maximum pressure available for filtration is always less than 14.7 lbs. per sq. inch, corresponding to a perfect vacuum at sea level; in some cases the actual effective pressure being not in excess of 7 to 8 lbs. per sq. inch. For materials amenable to this method of filtration, rotary vacuum filter operation is a very attractive proposition, being a continuous and automatic process with a consequent minimum labour charge.

In order to meet the extremely large demand in many fields for this type of filter, Oliver United Filters, Ltd., has developed two distinct and extremely successful types of rotary vacuum filters, the Oliver drum filter and the American or Oliver disc filter. Both of these filters are manufactured in many different sizes and types to meet varying requirements, and of materials suitable for the different problems involved, whether acid, alkaline or neutral. Filter areas range from 3 square feet to 700 square feet per unit in the drum type filter and from 22 square feet to 2,000 square feet per unit in the disc type. As the result of many years of successful operation of this type of filter, many features are incorporated which tend to successful operation. Particularly is this so in the case of materials which require washing, the design of the drum type of filter especially lending itself to efficient washing with a minimum amount of wash liquor; the drum being so arranged that a clean division between strong and wash liquor may be made upon the filter.

Dealing with Crystalline Materials

Before leaving the subject of rotary vacuum filtration mention should be made of a very successful type of filter which has been especially designed for handling crystalline materials and products of a similar nature, which upon the ordinary rotary type of vacuum filter cannot be kept in proper suspension in the filter tank. Twe separate types of rotary filters are available to meet these requirements, both of which when in operation upon crystalline materials where the pulp contains a relatively small proportion of slime, are capable of high output capacity, together with very low moisture content in the discharged solids. By means of an arrangement whereby a large volume of heated air may be drawn through the filter cake, remarkably low moisture contents are attainable.

As typical of the results obtained with this type of filter when operating upon a suitable material we have plants in operation upon vacuum pan salt where the moisture content in the discharged salt runs as low as 1.5 to 2 per cent. with correspondingly high filter capacity. Such rotary filters are in successful operation on a wide range of materials which includes ammonium nitrate, antimony sulphide, borax crystals, bicarbonate of soda, calcium arsenate, calcium borate, calcium carbonate, calcium citrate, calcium phosphate, calcium sulphate, calcium tartrate, caustic soda, lead arsenate, lead sulphate, potassium chloride, sodium hydrate, sodium nitrate, sodium stannate, zinc chloride and zinc sulphate. It will be seen that where the material handled is amenable to this type of filtration, there is a decided advantage in operation over and above that of centrifugals, as the



SWEETLAND PRESSURE FILTER.

power required for a given output is approximately identical under both systems, moisture content may often be in favour of the filter and operation in case of the latter is continuous.

Pressure Filters

For materials requiring higher filtration pressures than that obtainable under vacuum filtration conditions, Oliver United Filters, Ltd., have developed and perfected two distinct types of pressure filters, namely, the Sweetland and the Kelly filters, each of which has its own particular range of application.

The Sweetland pressure filter is suitable for working pressures up to 50 lbs. per square inch, and was primarily designed to overcome the obvious limitations of the ordinary plate and frame press. Its salient points are immensely reduced operating costs (one man can work a battery of Sweetland filters); cake discharge necessitates the breaking of one joint only and discharge from the filter leaves is automatic; high filtration rate, together with the saving of time in washing, drying and cake discharge, necessitates a cloth area of only one quarter to one twentieth of that required for equivalent output on a plate and frame press. The design of this filter also incorporates a closed circuit for the filtered liquor, which in many cases is of utmost importance. Such Sweetland filters are manufactured in varying sizes having unit areas of from 2 to 1,000 square feet and may be supplied in cast iron, acid resistant bronze, Staybrite, etc., to meet the nature of the material to be handled.

The Kelly filter is suited for higher working pressures than the Sweetland and may be operated at pressures up to 250 lbs. per sq. inch. Originally designed for use in the metallurgical field, it later earned an enviable reputation in many of the chemical and ceramic industries. The majority of the advantages claimed above for the Sweetland filter also hold good for the Kelly; the main difference, apart from design, lying in the fact that for cake discharge the leaves of the Kelly filter are withdrawn from the body of the filter, whereas in the Sweetland the leaves remain stationary in the body.

Standardisation in Woven Wire

F. W. Potter and Soar, Ltd.

THE usual method of specifying woven wire is to state the number of meshes to the lineal inch followed by the gauge of the wire, thus an aperture of definite size is specified. It should be noted, however, that the same number of meshes to the lineal inch can be maintained in several grades of woven wire, but as a different gauge of wire is used for each grade, apertures of different sizes are obtained. For example, 20 by 20 mesh by 28 s.w.g. will have an aperture 0.0352 by 0.0352 inches, while the aperture of 20 by 20 mesh by 23 s.w.g. will be 0.026 by 0.026 inches. Conversely, in many cases, apertures of the same size can be obtained in a number of grades having a different number of meshes to the lineal inch, for example an aperture 0.0221 by 0.0221 is common both to 26 by 26 mesh by 27 s.w.g. and 32 by 32 mesh by 34 s.w.g.

In addition it is often necessary to consider sifting capacity and strength. The aperture size having been decided the choice of the gauge of wire must be governed by the nature of the material to be treated and the method of sifting. In sieving and screening operations the advantages of using heavy cloth (woven with thick wire) are that the cloth will stand rougher usage, will carry more weight and have a longer life. The advantages of using light cloth (woven with thin wire) are that the meshes will not clog so easily and the higher percentage of sifting area will result in greater output. When, however, some latitude is permissible in the choice of the strength of the cloth it is advisable to adhere as closely as possible to the medium grades as these are more readily obtainable from stocks.

A catalogue of woven wire has been issued by F. W. Potter and Soar, Ltd., of Phipp Street, London, E.C.2, which contains a comprehensive series of tables giving all the information necessary for determining the correct grade of woven wire. The aperture sizes of each mesh in its various gauges in inches and millimetres, percentages of sifting areas, weights and much other information of assistance to users of woven wire is included.

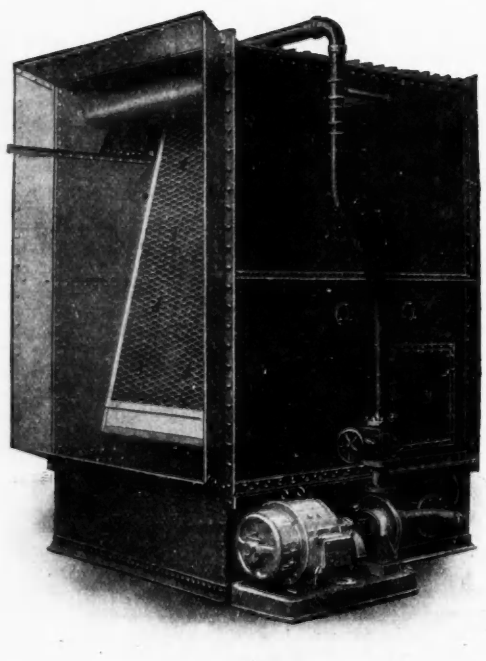
The Problem of Air Filtration

Heenan and Froude, Ltd.

ADVANTAGES claimed for the "Heenan" stationary air filter are high cleansing efficiency, positive cooling effect, entire freedom from loose moisture, lack of necessity for highly skilled attention, accessibility of all parts, small space occupied, and absence of danger from fire. Cleansing and cooling are effected by water-washed surfaces and not by sprays.

The accompanying illustration shows that the body of this filter is rectangular in shape, built up of steel plates stiffened where necessary with angles, and suitably mounted on a substantial base, the latter forming a tank. The filtering effect is obtained by drawing (or forcing) the air through two sets of screens fitted one behind the other, in the front part of the filter, these screens being formed of metallic wool of standard size and thickness, held together between frames of expanded metal. To ensure that the air is thoroughly cleansed, a flow of water is continually passed over the screens, being maintained by a small centrifugal pump, fitted at the side of the filter which delivers the water to the top of the screens. The water, after percolating through the screen, falls into the tank at the bottom, where it passes through a strainer and returns to the pump to be recirculated. The screens are quite accessible and easily removed for cleaning purposes, but experience shows that this is seldom necessary, owing to the fact that they are continually washed with water, the dirt, etc., being carried with the water to the bottom of the filter, whence it can be removed through sludge doors. The air after passing through the screen, passes a series of fixed eliminators, fitted at a suitable distance from the screens, which catch any small particles of loose moisture that may have passed the second screen. The total resistance to passage of air through the machine does not exceed 0.7 inch water gauge.

In addition to cleansing the air, this process, of course, has a great cooling effect, reducing the temperature of the air to within a few degrees of the prevailing wet bulb temperature. The water level in the base or tank is maintained by an ordinary float valve connected to the water supply, the amount of water used being the amount lost by evaporation in passing through the filter. Thirteen standard sizes in these filters, ranging in capacity from 1,300 to 100,000 cu. ft. per minute, are available.



THE "HEENAN" STATIONARY AIR FILTER.

Filters for all Filtration Problems

Kestner Evaporator and Engineering Co. Ltd.

THE Kestner Evaporator and Engineering Co., Ltd., of 5 Grosvenor Gardens, London, S.W.1., continues its policy of manufacturing filters of various types for specific filtration problems in the chemical industry. Standard types of plate and frame filters are not manufactured by this firm, but considerable attention is devoted to various designs of vacuum filters.

Many products can be successfully filtered by vacuum filtration but, in some cases, the rate of filtration is unsuitable for the use of continuous rotary vacuum machines. For such products, batch filters are available, while, for more rapidly filtering suspensions, the Kestner rotary vacuum filter gives a similar result with the advantages of continuous operation. Apart from certain general principles of design, this continuous filter has not been standardised, each filter being considered with a view to constructing the most suited type for each particular problem with regard to contact, materials of construction, suitability of filtering medium, degree of washing and draining and other factors. Totally enclosed filters are supplied for the treatment of noxious or inflammable liquids, and in places where the filtration forms a part of an extraction process, the filters and intermediate extracting vessels are arranged in a battery for complete and continuous working. Such arrangements can also be used with the Kestner open type filter.

One special feature of the Kestner rotary vacuum filter may be mentioned as it affects the efficiency of filtration and is a feature which is embodied in all Kestner filter designs. In order to obtain the maximum efficiency of washing and the driest possible cake, complete drainage is essential and, for this reason, the compartments below the filtering segments are specially constructed in order that such draining is obtained while washing is in progress, or while the cake is being dried preparatory to discharge.

Where filtration forms a part of a complete process, it is usually advisable to consider the process as a whole for, in many cases, several alternative methods of arriving at the required result are possible. For example, in the preparation of a dry powder from a suspension, filtration may be carried out at an intermediate stage, or it may be advantageous to treat the suspension directly in one of the continous driers manufactured by this Company. By the utilisation of efficient mixing and washing apparatus, it is frequently possible to improve the efficiency of filtration plant by carrying out the washing separately and utilising the filter surface solely for the removal of water, thus obtaining a drier cake than that obtained when a filter of similar size is used for both purposes. A special range of stirrers is manufactured by the Kestner Company for problems such as this, where intimate contact between a liquid and a suspended solid is necessary for extraction or washing processes before filtration.

A well equipped experimental works is maintained by the Kestner Evaporator and Engineering Co., where it is possible to investigate alternative methods of dealing with industrial problems, including such stages as extraction, washing, filtration, heating and drying.

Removal of Bacteria from Water

The British Pasteur-Chamberland Filter Co.

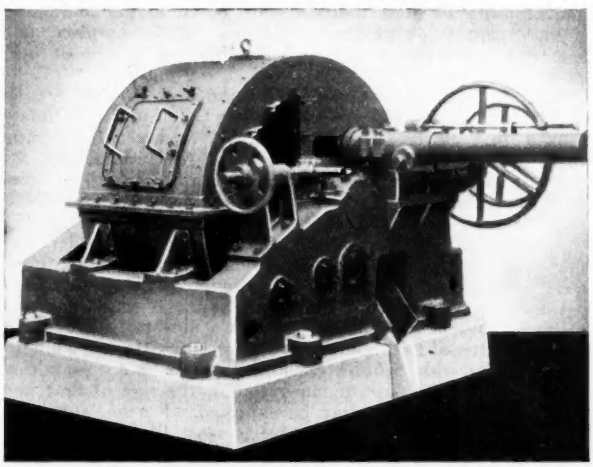
THE British Pasteur-Chamberland Filter Co., of 5 White Street, London, E.C.2., are pure water specialists, supplying hollow filter candles made of a biscuit porcelain material which unfailingly holds back all bacteria contained in water which is passed through the candles under the pressure of the service main. Where large volumes of water are to be filtered, a battery of such candles is immersed in the water so that the water passes from the outside to the inside of the candles in the course of filtration. Fitted with 500 tubes, under a pressure of 25 to 30 lb. per sq. in. such a filter is capable of dealing with 7,500 gallons of water per day. It is necessary from time to time to clean the candles by removing the deposit which has accumulated on the outer surface. This is best done by brushing them in water with a small fairly hard brush. The candles, themselves, are very hard and difficult to break, and the process of cleaning by brushing does not wear them away. The expense of renewals of filter-tubes in consequence of wear is therefore avoided.

A Bulk Centrifuge in Continuous Operation

Super Centrifugal Engineers Ltd.

THE new Sharples bulk centrifuge supplies an urgent need in rendering possible the solution of two of the most difficult and troublesome problems frequently encountered in process work. These can generally be classified under two headings, namely: (a) The efficient physical separation and clarification of liquids containing a high percentage of solids, and (b) the separation and dehydration of solids from liquids. Both of these operations can now be accomplished with complete success by utilising the exceptionally high centrifugal force generated in this new centrifuge, which has been introduced by Super Centrifugal Engineers, Ltd., of 101 Grosvenor Road, London, S.W.1.

The Sharples bulk centrifuge is of somewhat novel design, differing from the ordinary vertical centrifuge, inasmuch as the basket revolves in a vertical plane about a horizontal shaft, which is secured in two self-aligning ball bearings, the basket being housed in a suitably designed cast iron frame. Attached and fixed to this frame is the mechanically operated device for the removal of the extracted solids. These, when removed, fall by gravity into a receiving chute fixed inside the basket, which conveys them to any suitable receiving vessel. This removal of solids is carried out whilst the machine is running at full speed. The material under treatment is also supplied to the basket at full speed, the operation being perfectly continuous. A spraying pipe connection is provided so that the solid cake may be washed or rinsed with either steam, water or mother liquor before cutting out. The periphery of the basket can be made either solid or perforate according to the nature and character of the material under treatment. When a perforate basket is employed, the action is similar to that of filtration, the liquor being driven by centrifugal force through the layer of accumulated solids, and thence, through the perforations, into the outer casing, where it is piped away, either to waste or storage. Conversely, when a solid basket is used, the liquor is decanted away by a suitable decanting device. In each case the solids are removed and discharged by the mechanically operated device already mentioned, whilst the machine is operating at full speed.



THE NEW SHARPLES BULK CENTRIFUGE.

The Sharples bulk centrifuge appears to have no equal for the drying of sludges or crystalline solids. It mechanically discharges the dried solids at full speed, thus no time is lost in stopping the machine, shovelling out the solids and starting up again. The filtering media are not touched or damaged, as is often the case when bars are used to loosen the cake before shovelling out. Owing to the continuous operation a smaller charge can be used. This means a thinner cake, giving better rinsing, more thorough drying, and a higher output. The output is high; for instance, one 70 inch Sharples bulk centrifuge will dry sulphate of ammonia to 1 per cent. moisture content at a capacity up to 70 tons of salt extracted per 24 hour day.

Filtration of Glue Liquors

F. Jahn and Co.

IMPROVEMENTS in pressure filters for treatment of hot gelatine and glue liquors have been made during the past year by F. Jahn & Co. (A. R. Jahn's Patents), filtering plants of a new type having been introduced into glue factories. In these plants the filtering is done by forcing the liquor to be treated through two inch layers of specially prepared fibre cakes which are held in position in recessed aluminium plates. The plant includes a washer tank, fitted with a propeller for disintegrating (whilst washing) the fibre cake after its pores have been filled with dirt, so as to clean the fibre and make it suitable again for another filtering operation. After the fibre has thus been washed and prepared, a pressure operated cake-compressing press is used for the fibre to be re-made into cakes, for replacement of those in the pressure filtering machine which have done service. Satisfactory results are obtained in filtering such difficult liquors as gelatine.

The Filtration of Viscous Liquids

Johns-Manville Co. Ltd.

FILTER aids composed of diatomaceous earth or kieselguhr have been used for many years in manufacturing processes where it was desired to improve the clarity of the filtrate or to accelerate filtration, the biggest users being sugar manufacturers. Results have frequently been disappointing as the majority of these materials are crude earths containing a high percentage of clay which reduces the porosity, and metallic impurities which prohibit their use for most purposes.

Starting with an unusually pure and high quality deposit of diatomaceous silica, Johns-Manville Co., Ltd., of Windsor House, 46 Victoria Street, London, S.W.1, are able by carefully regulated processes, to supply three grades with all the essential requirements of the ideal filter-aid. The three grades, known as Filtercel, Standard Supercel and Hyflo Supercel, are in a fine state of division, porous, light in weight, inert, and have a low specific gravity in order that they may remain easily in suspension. The essential difference is in their porosities, Hyflo Supercel being the most porous and free filtering, Standard Supercel somewhat less so, and Filtercel the least. Now that a uniform product like a Celite filter-aid is obtainable Johns-Manville are able to supply users with definite recommendations as to quantities to use, and in the case of many liquids the rate of flow per unit of filter area that may be expected. Further they can recommend which of their grades is most likely to suit the requirements of the customer. For example, although Hyflo will in the majority of cases produce a brilliant filtrate there are some instances where, on account of the nature of the impurities to be removed, it is essential to use Standard Supercel or Filtercel, even though at the sacrifice of a certain amount of speed of filtration; typical cases are gelatine and fruit juices.

To-day, it is possible to filter rapidly, efficiently and economically many liquids which either by reason of their viscosity or the nature of the impurities, were formerly believed impossible to filter on account of slowness or cost. Examples include acetate and viscose solutions, many varnishes, collodion, pectins, petroleum refinery products, waxes, shellac, etc. In many instances where pressure filters were formely turned down as not meeting the case, and settling or centrifuging was resorted to, the question has now been reconsidered and filters in conjunction with filter-aids are in satisfactory operation.

Chilean Nitrate Research Award

THE Chilean Nitrate of Soda Educational Bureau has again made provision for the Chilean Nitrate of Soda Nitrogen Research Award. These awards were designed to foster research on the rôle of nitrogen in economic crop production. Any research worker in the United States or Canada is eligible. In selecting candidates for the award attention is given both to the merits of research already accomplished and to the promise for future work. The award is administered by the Nitrogen Research Award Committee of the American Society of Agronomy. The award will be made at the meeting of the American Society of Agronomy in Chicago, November 19-20.

Filtration of Lubricating Oils

The Stream-Line Filter Co. Ltd.

THE Stream-Line filter has for several years been recognised as an efficient means for dealing with used lubricating oil which it delivers in condition equal to new. More recently, in the course of the last couple of years, the filter has been applied with equal success to the filtration of switch and transformer oils. A single passage through the filter removes all colloidal carbon and fibres from used insulating oil and at the same time thoroughly dehydrates the oil so that remarkably high dielectric strengths are returned.

This filter, invented by Dr. H. S. Hele-Shaw, consists essentially of one or more columns of specially prepared paper discs compressed together and mounted on a rod or rods. The inequalities of the paper surfaces form passages through the pack of infinite fineness. The liquid to be filtered is forced by pressure or drawn by vacuum through the filter pack from the outside to the centre hole, seen in the illustration, and every particle of dirt however small is removed from the liquid and remains on the outer surface. The solid particles form a cake round the filter column which in time reduces the output, but this cake can be entirely removed with the utmost ease by means of a small reverse flow of compressed air and each time this is done the filter is restored to its original condition. It is well known that the carbon which forms in crankcase oil is colloidal in character and that the individual particles are of microscopic fineness. The Stream-Line filter offers the only practical method of removing these and completely cleaning crankcase oil by purely mechanical means and renders the oil perfectly clean and bright. The life of the packs is in most cases over a year as the special paper of which they are made is very durable.

Glass Filter Apparatus

Jena Glaswerk Schott.

IN ceramic filters it is usual to bind the ground and sifted non-corrosive substances with kaolin or glass powder, the reliability of the material depends largely on the resistivity of the binder. The Jena^er Glaswerk Schott & Gen. have for some time past suceeded in making filters from no other material but pure Jena laboratory glass sintered at the edges of the particles. The size of pore depends upon the particle size of the sifted material used. The pore diameter varies from about 1.5 to 500 thousandths mm. The sizes of the filters themselves may be chosen from 10 mm. to 610 mm. diameter. The filters are not attacked by chemicals against which Jena laboratory glass is resistant, which means that they may be used freely with all liquids except hydrofluoric acid and hot alkaline lyes. Up to 185 mm. diameter, the filters may be fused into any shape of container vessel, and liquids can be poured on to the filters at the temperature of boiling water. The crucibles for analytical work are best suited for drying in the furnace up to 150°C. For ignition they are better placed in an electrical furnace and ignited not higher than 600°C.

For higher chemical and thermal resisivity quartz filters are made after the same method. These filters are produced in diameters from 10 mm. to 30 mm. They may be ignited up to 1200°C. without any special care being taken. Such glass and quartz filters have been protected by British patents Nos. 218286 and 226182. A description has been published in *The Analyst* 50, 440 (1925) and in *Filtration and Filters* by J. A. Pickard, (London, E. Benn, Ltd., 1929), (page 57). The large filters measuring between 200 and 610 mm. diameter, in medium porosity, can be employed for technical purposes in the filtration of pure chemicals and in fine distribution of gases in highly corrosive liquids.

Bolivia Moratorium

A LAW has been promulgated by the Bolivian Government establishing a moratorium of 30 days in respect of the settlement of foreign obligations and of debts payable in foreign currency. The moratorium may be prolonged at the discretion of the Government.

Hydrogenation of Fatty Acid Esters

Use of Copper as Catalyst

IMPORTANT work has recently been done in the catalytic hydrogenation of aliphatic compounds, both in the United States and in Germany. Hitherto the chief method for reducing esters or acids, by way of their esters, to the corresponding primary alcohols has been that of Bouveault and Blanc, using sodium and alcohol, dating back to 1904. This method, however, suffers from various defects, and in view of the great importance of finding a suitable method a large amount of research has been undertaken, for example, by H. Adkins and his colleagues in the organic chemistry laboratory at Winsconsin University, and by W. Normann, one of the pioneers in hydrogenation, in Germany.

Preparation of Copper Chromite Catalyst

Referring to the investigations of Adkins and his co-workers, a special correspondent in the Chemical Section of a recent issue of *The Manchester Guardian Commercial*, states that they have now extended their programmes to include other catalysts besides nickel, more especially copper chromite, and have thereby obtained exceptionally good results. The copper chromite catalyst was obtained by decomposing copper ammonium chromate, formed in the first place by adding ammonium hydroxide to a solution of ammonium dichromate and cupric nitrate trihydrate. The reddish-brown precipitate was filtered, dried, powdered, and then decomposed by heat. After cooling, the finely powdered black product is treated with a 10 per cent. solution of acetic acid, then filtered, washed, dried and powdered. This catalyst was used for hydrogenating a large number of organic compounds, and proved superior in many ways to all other catalysts, including nickel. It is less sensitive than nickel to sulphur and halogen poisons, and need not be freshly prepared before use. It does not change in contact with air or moisture; it is more easily prepared, and smaller quantities may be used.

Reduction of Esters to Alcohols

Of special interest is the use of copper chromite in the catalytic hydrogenation of esters to alcohols, the hydrogen pressure being about 220 atmospheres and the temperature 250° C. The desired alcohol was separated from the accompanying ethanol by fractional distillation through a Widmer column Excellent yields of 80.5 per cent. in the case of ethyl succinate, and up to 98.5 per cent. with ethyl myristate were obtained. Attempts, however, to reduce malonic and phenyl acetic esters have so far been unsuccessful, though it is hoped that this will be achieved ultimately.

Normann's work, relating to the catalytic reduction of the carboxyl group, was delivered as a sealed communication to the German Chemical Society as early as October, 1930. He also used a copper catalyst for much of his research, mostly in the form of carbonate deposited on kieselguhr, the same as nickel is used in fat-hardening. He carried out some work with other catalysts, but found copper the most effective. Yields up to 97 per cent. of the theoretical were obtained, using a hydrogen pressure of 250 atmospheres as a rule, but occasionally up to 400 or even 500 atmospheres. The raw material treated consisted of individual fractions of fatty acid ethyl esters, natural glycerides or fats, pure fatty acids, and mixtures of these.

Optimum Working Conditions

The amount of catalyst used was rather large, about 10 per cent. It may or may not be precipitated on kieselguhr, and may or may not be first reduced in a hydrogen current at about 190°C. In any case it is, however, reduced when the reaction starts at the high temperatures used. If no kieselguhr carrier is used a smaller amount of carbonate (5 per cent.) may be sufficient; and, as is the case with fat-hardening, the catalyst works better if it is not quite pure, for then it does not coke or sinter so easily and thus lose its effective surface action. The optimum working temperature was found to be 310 to 325°, at which temperature there would normally be a rapid decomposition of the material, but this is avoided by heating in hydrogen under high pressure in the presence of a copper catalyst. Under conditions such as these the copper catalyst is more sensitive to poisoning than nickel is with fat-hardening, and Normann therefore recommends that only freshly-obtained material should be treated.

Lethalate Colloidal Lead Arsenate

A New Form for Spraying

AT the Imperial Fruit Show, which was opened in Manchester yesterday, (November 30) there is on view for the first time, we believe, a new form of colloidal lead arsenate which is likely to attract considerable interest. The sole inventors and manufacturers of this product are Lunevale Products, Ltd., Queen's Mill, Lancaster, and the sole selling agents are the well-known firm of Chas. Page and Co., Ltd., of London, Manchester and Glasgow. Many other chemical preparations of interest to horticulturists are also on view on the same stand.

Insecticide in Spray Form

The efficiency of any insecticide is in direct ratio to its state of division when sprayed upon the leaf or insect. The ideal state is reached when the whole surface sprayed is uniformly covered with an infinitely thin film of a compound possessing qualities toxic to insect life. In the case of lead arsenate powder alone suspended in water the insecticidal value of the spray is great, provided the original powder was extremely finely pulverised; but, no matter how well ground this material may be, there must always be a small precentage of comparatively coarse particles which from the point of view of the fruit-grower are almost useless. No insect is likely to attack a large bump of foreign matter; it will feed around it. The large percentage of extremely fine particles when mixed to spray strength and applied will be concentrated in the centre of each tiny drop of spray when it finally dries, the space between each drop providing safe feeding ground for any insect. In order to correct this bad point so called " spreaders " are incorporated with or added to lead arsenate sprays. These certainly help up to a point by causing the drops to flatten and merge on the leaf, but owing to the flocculent nature of the lead arsenate itself the particles present in the water tend to aggregate and become concentrated in one part leaving another free from poison. Paste lead arsenate is preferred by many fruit-growers, since with this there is no loss due to incomplete pulverisation. But, here again, the flocculent nature of the compound when diluted to spray strength, does not give the ideal division of particles on the leaf.

Colloidal Arsenate

The ideal condition is now to be obtained by employing lead arsenate in the colloidal state, that is, with a particle size of almost infinitely small diameter. On dilution to spray strengh with plain water colloidal lead arsenate yields a fluid resembling thin milk, and this, even after many days and weeks standing, only shows a slight clearance on the surface. When sprayed, the particles do not aggregate but spread over the whole leaf area, and when the water has evaporated a faint bloom is noticeable everywhere. No insect can bite a leaf so treated in any spot without assimilating poison, and the colloidal lead arsenate, owing to its extremely fine state of division, is excessively toxic, since it is so easily decomposed by the digestive juices of the insect system.

A valuable property of this new condition of lead arsenate is its great resistance to rain. When colloidal lead arsenate has once dried on the leaf giving it a peculiar bloom, a smooth as opposed to the granular surface of ordinary powder and paste is obtained. So tenacious is this film that it can be subjected to a washing with water and yet it will not yield. A leaf so tested will be found to have retained its toxic properties to the same extent as before washing. Finally, with colloidal lead arsenate it is no longer necessary to weigh out quantities. All handling can be effected by liquid measurement. A convenient spray strength is two pints to 100 gallons of water.

The discovery of this lethalate colloidal lead arsenate is, we are informed, the fruit of intensive research over a long period by the staff of Lunevale Products, Ltd. An average analysis representing many batches is as follows:—Water, 50 per cent.; lead oxide (PbO), 31.5 per cent.; arsenic oxide (As_2O_5), 16 per cent.; total water soluable arsenic, 0.05 per cent. The arsenic oxide content, it will be observed, is not less than that of ordinary 50 per cent. paste, which is sometimes sold as 15 per cent. As_2O_5 lead arsenate.

The Past and Future of the Dyestuffs Act

A Survey by W. J. U. Woolcock

In an address to the London Section of the Society of Dyers and Colourists on Friday evening, Mr. W. J. U. Woolcock, who might almost be called the "father" of the Dyestuffs Act and whose knowledge of its working during the whole period of its operation, is without equal, presented a most complete summary of the purposes, working, and results of the Act. This is of exceptional interest to all interested in the future of the measure which, unless again renewed, will expire on December 31 of this year.

It seems appropriate, at a time when everybody's thoughts are turned to the question of what necessary assistance must be given to British industry, that one should consider the working of one of the pieces of legislation which has been devoted to this object. Moreover, the time is appropriate because the Dyestuffs Act, unless again renewed, expires on December 31 of this year.

Of the three possible methods of aiding home production, namely: (1) Subsidies, (2) Tariff, (3) Prohibition and Licence, the Dyestuffs Act is the only example we have of the last method, but it is a matter of great interest to note how many other countries are now adopting this method, particularly in connection with nitrogenous fertilisers.

The Sankey Judgment

So much has been said and written during the past few years with regard to the early history which led up to the passing of the Act that an apology is necessary for referring to these facts. It may be, however, that this early history is not present in the minds of all of you, and it is worth while very briefly recapitulating the position of twelve years ago, in order that the position to-day may be properly understood.

The story begins with the judgment of Mr. Justice Sankey at the end of 1919 declaring that the exclusion of foreign dyestuffs under the Prohibition of Imports Proclamation of February of that year was illegal. For a little over twelve months after this blow to the industry, there were no restrictions of imports whatever, and very large quantities were brought into the country amounting to about £7,000,000 worth of foreign dyestuffs; this, it should be noted was in addition to the dyestuffs supplied on Reparation Account. The influx of such an enormous quantity of foreign dyestuffs threatened with extinction the dyestuff industry of Great Britain, which had been built up with great labour and in the face of enormous difficulties during the war. It is sometimes forgotten by those who complain of the slowness of the development of the dyestuffs industry in the early days of the Act, how prejudicial to that development were these large stocks of foreign dyestuffs. The painful lesson will, however, have been worth while if we resolve that no such gap shall occur again.

The Act and What it Does

It was not until the last days of December, 1920, that the Dyestuffs (Import Regulation) Act passed through all its stages in the House of Commons and the House of Lords, and received the Royal Assent. In those days the difficulties through which colour users had passed were so recent that the Act received the support of a very substantial number of that body. It first of all prohibits for ten years the importation of "all synthetic organic dyestuffs, colours and colouring matters, and organic intermediate products, colours, or colouring matters." Having done that, it provides machinery whereby such of these products as it is necessary to bring into the country shall be admitted under licence of the Board of Trade.

To assist the Board of Trade, it sets up an Advisory Committee which consists of eleven members; five of them represent the colour using industry, three the dyestuff manufacturers, and the remaining three—one of whom is chairman—are independent members. If a dyestuff user desires to import a foreign colour, his application is considered by a committee on whom five out of the eleven members represent the using industry. It is to be presumed, and indeed it has been found in practice, that the representatives of the users would quite naturally lean to the support of the application. On the other hand, the makers may be expected to desire the keeping out of the foreign dyestuff. If the users can convince only one independent member, they have a majority for the granting of the licence. The maker's case has only the votes of three members in its favour; they, therefore, have to convince the whole of the independent members of the Committee before they can secure a majority to keep the foreign dyestuff out. Although this loads the dice against the makers, in practice it has worked very well.

Reason for Issue of Licence

There are two reasons why an applicant may desire to import a foreign dyestuff. The first is comparatively simple and is dealt with easily, namely, because a British equivalent is not made here. In this case the dyestuff maker has to demonstrate that there is an exact British equivalent. Thanks to the assistant of the technical advisers, one for each side, who help the committee, as a rule this is quickly settled, but there is just one point of difficulty which occasionally arises. The British dyestuff may be equivalent to the foreign dyestuff for a large number of purposes, but not for all; and cases do arise every now and then where the committee has to consider the purpose for which the foreign dyestuff is to be used. If the user desiring to import can show that in his particular trade the British dyestuff, although it may be suitable for most purposes, is not suitable in his business, then a licence is granted notwithstanding the fact that in other branches of the trade it is refused. This may seem to you a commonsense procedure.

The Price Factor

The second ground for making application for a licence is not so easily dealt with. The committee, at the commencement of its work, laid down as a fundamental principle that the Act should be worked without placing the colour user in an "unduly disadvantageous competitive position." This really led us to the price question, and although there is nothing in the Act dealing with this matter, like so many other steps which the committee has taken, it was dealt with on a commonsense basis. It was obviously impossible to deal with each individual case, and a method was, therefore, devised whereby a "price factor" was fixed. First of all the pre-war price for the dyestuffs was determined by a small joint committee nominated by the Colour Users' Association and the Association of British Chemical Manufacturers. Then in June, 1922, the factor was fixed at three. The committee laid down the rule that even although the British maker was able to supply an exact equivalent of the foreign dyestuff which it was desired to import, unless he was prepared to supply it at something less than three times the pre-war price, the committee would issue a licence. In this way, one of the dangers common to all forms of safeguarding was overcome; the dyestuff maker, in effect, was told that he would have to be efficient behind the barrier and that the barrier would be lowered progressively to stimulate his efficiency. This was done, and in March, 1925, the factor was reduced to $2\frac{1}{2}$, in September, 1927, to 2, and in 1929 to $1\frac{3}{4}$.

When it came to the close of the ten years' period for which the Act was passed, that is towards the end of 1930, the dyemakers suggested that in any proposals for the future, prohibition of imports should only apply where a British maker was prepared to supply an equivalent product at an equal price. The object of this proposal was to secure a continuance of the development of the dyestuff industry in this country under conditions which would place no economic burden upon the consuming industries. It was realised, however, that this suggestion would require certain necessary safeguards to protect the British maker against unfair prices, quoted with the object of obstructing the development of the dyestuff industry in this country. When the Act, last year, was continued for a further twelve months, these proposals were adopted and the factor disappeared.

How the Act has Worked

So much for the machinery of the Act: how has it worked? If you will take any candid dye-maker or user, and take him at a time when he is not engaged in either pressing for the continuation of the Act or violently opposing its continuance, he will tell you it has worked very well. From my inside knowledge, I may add that those of us who were in at the commencement of the working of the Act never thought it would last twelve months. We agreed, however, that if the first twelve months could be got over, it would probably last the ten years. There is only one reason why it has done so, and that is to be found in the personnel of the committee. From the very commencement, although the views of the members were very divergent, there was a real desire to co-operate and, if it was at all possible, to make the Act work. The members got to know and respect one another, and to see each other's point of view. As the Chairman of the Committee (Sir Thomas Robinson) has so often put it, there was a "spirit of mutuality." I would like to add how very much in the opinion of members of the committee this was due to his wise and tactful guidance. I would also add, as my considered opinion, that this type of legislation, using the method of prohibition and licence, can only be successfully worked where the users who will be effected are a body with a strong representative association behind them.

Some of the Results

I now turn to some of the results. It is oft-repeated history how Great Britain led the way in the discovery of synthetic dyestuffs, beginning with Perkin's Mauve. The passing of the development of the industry into other hands and the sorry plight of the colour users when War broke out in 1914, are facts which I trust are firmly fixed in your minds. This was due to the fact that in 1913 we were importing about 41¼ million lbs. of foreign dyestuffs, 38½ million lbs. from Germany and 2¾ million lbs. from Switzerland. In Great Britain in 1913, we made only 9 million lbs. of dyestuffs, and of this total a certain proportion consisted of mixtures made from imported foreign dyestuffs. Even in the remainder, the manufacture of the dyestuffs was very largely dependent on foreign intermediates.

As a result of the passing of the Act, in 1922 the production in Great Britain had risen to 20 million lbs.; for the next four years, 1923-1926, it was of the order of 30 million lbs. In 1927 it rose to 40 million, in 1928 to 57 million, and in 1929 it was 55¾ million lbs. The figure for 1930 is, owing to the slump in trade, 42½ million lbs. Without going into too much detail, the position can be stated briefly thus:—Whereas in 1913 we made 20 per cent., by weight, of our requirements and imported 80 per cent., to-day we make 90 per cent. and import 10 per cent. *by weight.*

I emphasise "by weight," because if the amount is measured by value, the percentage is higher, the imported dyestuffs costing more per pound. This leads both users and makers to draw a moral, and I must leave you to decide between them, feeling as I do that the truth lies somewhere between the two. I doubt very much whether the British maker wants to make all these imported dyes, and, equally, I doubt whether the British user really needs them. Time will show very soon what the real position is. I think the present rate of exchange between this country and continental countries, increasing as it does the cost of purchases abroad, will show the degree of necessity for the importation of these colours. If they are really necessary, the colour users will, of course, be ready to pay the increased price, but should there be British colours which, while not exactly equivalent, will do quite as well, we shall find the demands for licences decrease.

We come, therefore, by general consent to this conclusion, that by means of the Act a very substantial dyestuffs industry has been built up in this country. It has been an expensive process and the colour users deserve all credit for the way they supported the industry, particularly in the early days when the cost to them was heavy. They paid a high insurance premium to establish the industry. The dye-maker, on the other hand, has not made very much money out of it. In the early days he found the enormous quantities of dyestuffs imported between the Sankey judgment and the passing of the Act, and also the importation of the Reparation Dyes, a severe handicap. I think it is also a fair criticism that there was a lack of co-ordination among the makers in the early days. The formation of Imperial Chemical Industries and the absorption of some of the other dye-makers into the larger unit makes the outlook more hopeful for the industry, and at the same time gives the colour user confidence in the future development of the industry. He probably feels that his insurance premium was worth paying.

No Compromise on One Point

When, twelve months ago, the makers offered, if the Act were continued, to meet the foreign price unless it were a dumping price, it seemed as though the last jarring note had been stilled. This is not so. The abatement of much more important handicaps on the users leaves in solitary, and I think undue, prominence one grievance which must be dealt with. The Colour Users' Association, through their chairman (Sir Henry Sutcliffe Smith) say that "the offer of the British makers to meet foreign prices has been nullified by the fact that foreign producers refuse to quote on these terms." Not all colour users agree that there is difficulty in obtaining foreign quotations, but certainly some of the large users make this complaint. "After all," asks Sir Henry, "is it reasonable to expect a foreign competitor to furnish his lowest prices, knowing all the time that his quotation will be immediately placed before a competitor whi will have the option of refusing or accepting the business at the same price." This kind of "reasonableness" completely ignores the fact that the Act was passed to foster the development of the dyestuffs industry in this country, and that it gives, in effect, the most extreme form of protection imaginable. Further, it leaves out of all consideration that the Act is being worked in such a commonsense way that the maker gets no protection in price, but solely the right to the first refusal of the business on equal terms. It is only necessary to compare this position with what it would be under a system of tariffs to see how much more difficult it would be for the user. The user's reply, however, is that he cannot know whether the maker is meeting the foreign price unless he can get a quotation. He therefore proposes the abolition of the last shred of protection, and, in effect, wipes out the Act entirely.

What he is seeking, is to be placed in an advantageous position whereby his custom is put up for auction by sealed tender. At one time it was proposed that after the independent members had awarded the purchase to the foreign competitor, the British maker should be told at what price the purchase has been made, in order to help him to compete next time. Now, I think, even this suggestion has been withdrawn.

The makers were prepared to go a very long way in accepting the users' suggestion, but there appears to be no reasonable compromise which can be made. It seems that the one remaining grievance will have to continue, at least, until the end of this year.

The Future

What can I say of the future? The Act comes to an end, unless it is renewed, on December 31, 1931. Will it be continued, or will a tariff take its place? Very often during the past ten years, I have heard users say they would much prefer a straightforward tariff to the present system. Now that their preference may be a question of practical politics, I wonder how many still prefer a tariff.

If I may sum up my own views as to the working of the Act, I would say this:—Thanks to the goodwill of the large majority of the users, the Act was maintained in its early days, when the machinery was new and not run in. It was increasingly effective in establishing the dyestuffs industry during the middle period when the dumped stocks, owing to the Sankey judgment and the Reparation Dyes, had been absorbed. During the last four years it has to a large extent accomplished its purpose and, as worked at the present time, it does not place the user in an "unduly disadvantageous competitive position." In view of all this, I, personally, would like to see the Act continued, believing as I do that this is best for both user and maker. But, "the customer is always right," and if he prefers a tariff, then I suppose this wonderful experiment of ours may have to go and we shall be left with the satisfaction of eleven years of very interesting work well and truly done.

Utilisation of Bituminous Coal

Third International Conference, Pittsburgh

NEARLY one hundred papers, contributed by scientists of fifteen nations, are listed in the preliminary programme of the Third International Conference on Bituminous Coal which will be held November 16 to 21, in Pittsburgh. From the list of papers announced by Dr. Thomas S. Baker, organiser of the meeting and president of the Carnegie Institute of Technology, under whose auspices this world gathering of fuel technologists is being held, it appears that almost every phase of coal utilisation will be considered.

A section on the economics of the coal industry has been included in the conference this year for the first time. Because of the desperate condition of the industry throughout the world, the organisers felt that it would be impossible to hold any major discussion on coal without considering this side of the industry. The inter-relationships that exist between coal, petroleum and natural gas will be discussed by Dr. W. T. Thom, Jr., of Princetown University. This address will contain an authoritative resume of the economic situation in the three major fuel industries, and will propose a method for the rehabilitation of the soft coal industry. Other sections of the conference will be concerned with gasification, hydrogenation and liquefaction, low and high temperature distillation, coal cleaning and preparation, smoke and dust, by-products, origin and classification, metallurgy and competition of coal with other fuels.

Among the distinguished European scientists who will be present are Dr. Franz Fischer, director of the Kaiser Wilhelm Institute for Coal Reserch, Mülheim-Ruhr; Professor R. V. Wheeler, of the University of Sheffield; Dr. Friedrich Bergius, of Heidelburg; Professor Cecil H. Desch, University of Sheffield; Professor Dr. Ernst Berl, of Darmstadt; and André Kling, director of the Municipal Laboratory of Chemistry, Paris.

The preliminary programme includes the following papers by English visitors:—P. C. Pope, Secretary to The Institute of Fuel, London, "Present and Future Positions of the Low Temperature Carbonisation Industry in England"; Professor Cecil H. Desch, University of Sheffield, "Prevention of Smoke in Metallurgical Operations"; Dr. M. Barash, West's Gas Improvement Co., Manchester, "Steaming in Continual Vertical Retorts"; L. H. Sensicle, Gas Chambers and Coke Ovens, Ltd., London, "Intermittent Vertical Chamber Ovens: Some Recent Developments"; Professor W. R. Chapman, London, "Coal Cleaning Practice in Great Britain"; N. E. Rambush, Power-Gas Corporation, Stockton-on-Tees, "Large Capacity Water Gas Generators in England"; Harald Neilsen, consulting engineer, London, "High Combustion Densities in Restricted Furnace Space"; Professor R. V. Wheeler and R. A. Mott, University of Sheffield, "Blending of Coal for Coke Making"; Professor Wheeler and Dr. J. H. Scholtz, "Carbonisation of Bituminous Coal in Streams of Gases"; Professor Wheeler and T. G. Woolhouse, "Effect of Oxidation on the Coking Properties of Coal"; Professor Alfred W. Nash, University of Birmingham, "Synthesis of Lubricating Oils from Coal and Its Gaseous Products"; Dr. F. S. Sinnatt, Fuel Research Board "Some Aspects of Fuel Research"; John Roberts, fuel technologist, London, "Blending: With Special Reference to the Davidson Rotary Retort"; H. Clifford Armstrong, John Brown & Co., Sheffield, "Future Fuel Problems in Metallurgical Practice"; Dr. M. A. Vernon, National Federation of Iron & Steel Manufacturers, "Statistical Research and Its Application to Fuel Economy."

The following papers are to be presented on the subject of hydrogenation:—Professor Dr. Hans G. Grimm, I. G. Farbenindustrie A.G., Ludwigshafen a. Rhein, "Recent Progress in Refinement of Coal and Oil"; Dr. Friedrich Bergius, Heidelburg, "Early History of Hydrogenation"; Dr. Gustav Egloff, Universal Oil Products Co., "Simultaneous Cracking, Carbonisation and Gasification of Coal and Oils"; Professor A. Gillet, University of Liège, "Dispersion of Coal in a Liquid Medium"; J. Ivon Graham, University of Birmingham, "Action of Hydrogen upon Coal"; André Kling, Director, Laboratorire Municipal de Chimie, Paris, "Catalysts in Hydrogenation Cracking"; Dr. Hans Tropsch, Prague, "Catalysts for High Pressure Reduction and Hydrogenation of Phenols and Hydrocarbons."

A Bookman's Column

A PROFESSOR of chemistry once reprimanded one of his students for not attending the early nine o'clock lectures on advanced organic chemistry. To which the student retorted that he, too, had a copy of Stewart's *Advances*. This Stewart habit is growing amongst professors and students, to judge from the rapid manner in which edition follows edition. The sixth edition has just reached us of *Recent Advances in Organic Chemistry*, by Alfred W. Stewart, D.Sc., Professor of Chemistry in Queen's University of Belfast. Vol. I. Pp xii, 429, with frontispiece; Vol. II. Pp xii, 432, with illustrations. (Longmans, Green & Co., 1931, 21s. per volume). It is beyond the limits of the present notice to deal adequately with this well-known work. Each of the thirty-five chapters is in itself a model essay in organic chemistry, but it is very tempting to refer specially to Chapter X (Vol. II) entitled "Some theories of the natural synthesis of vital products" (pp 260-301). It is written from notes supplied by Collie. What a wonderful combination Collie's ideas and Stewart's pen make!

* * *

ONE of the best books on fertilisers has just been published by Ernest Benn, Ltd.—*The Use of Fertilisers in Tropical and Sub-Tropical Agriculture*, by A. Jacob, Ph.D., and B. Coyle, M.Sc., (pp 272, 10s. 6d.). It is a real addition to the literature of the subject, being consistently practical, based on wide and sound experience, comprehensive in its scope, and packed with matter. The letterpress is supplemented by over a hundred interesting and helpful illustrations. The conditions in tropical and sub-tropical countries differ widely from those in temperate climates, and it is of real value to have authentic information based on tests that have demonstrated the practibility of increasing crops by the rational use of artificial fertilisers. The authors have done their work extremely well, and the book should become widely recognised as an authority on the subject.

* * *

We have received from the Mellon Institute of Industrial Research, Pittsburg, an interesting pamphlet on *Chemical Economics*, comprising a review of the American literature on the subject 1925-1930, by Dr. Lawrence W. Bass, formerly a member of the executive staff. This review of the contributions to chemical economics is confined chiefly to the general chemical periodicals which are available to every chemist.

Official Tests on Coal Distilling Plant

THE Department of Scientific and Industrial Research which is empowered by the Government to make tests at the public expense of plants for the low-temperature carbonisation of bitumous coal, has just issued one of these reports dealing with a retort erected by the Leicestershire (L. & N.) Coal Distillation Co., Ltd., at Newbold near Ashby-de-la-Zouch (H.M. Stationery Office, price 9d. net). This retort is of the rotating type internally heated by hot gases. It was erected some years ago, and has been used for carbonising various grades of coal. The retort worked smoothly during the test, and such difficulties as were experienced were largely due to the type of coal—a low-grade coal—used for this test. The object of these tests is to place in the hands of those interested accurate technical data on the quality and quantity of yields, the throughput of the plant, the working temperatures, and the general ease of working. Conditions applying to such tests are published as an appendix to the report under review.

International Calcium Cyanamide Syndicate

DESPITE the failure of the international nitrogen negotiations, the International Calcium Cyanamide Syndicate will continue operations. The syndicate covers 92 per cent. of the cyanamide production of the world through its head office in London. Notice of termination of the syndicate agreement was given provisionally after June 15, 1931, but existing agreements between the individual countries are still in force. Operations are to be continued in so far as they are not affected by the protective measures taken by various governments, namely the prohibition of imports of nitrogen, including cyanamide.

World Export Trade in Chemicals, 1930

The Favourable Position of British Chemical Exports

The world's four largest exporters of chemicals, according to "Commerce Reports," which is issued by the United States Department of Commerce, are Germany, the United States, Great Britain and France, which together in 1930 exported approximately $720,000,000 worth, or two-thirds of the world's exports of chemicals.

GERMANY, with the advantage of an early start in the chemical export industry, surpassed all other countries and accounted for $207,000,000, while the United States, next in rank, exported products to the value of $172,000,000. France and the United Kingdom, the third and fourth major exporters of chemicals, shipped $126,000,000 and $124,000,000 respectively. Although the world depression affected all countries, Europe still remained the world's largest import market for chemicals and Germany was the largest source of supply for the Continent. The United States in 1929, the last year for which complete data by countries have been compiled, however, exceeded its competitors in North, Central and South America, with total sales amounting to $76,000,000, while Germany, the second largest exporter to these markets, sold $64,000,000 worth, including the shipments to the United States.

Effect of World Depression on Germany

The exports of chemicals from Germany during 1930 were the lowest since 1926. The world-wide depression that began in 1929 became more acute during 1930, and the German chemical industry was affected accordingly. Some branches, such as the toilet preparations, progressed slightly and others, like the explosive and plastics group, maintained their positions. The two large groups, industrial chemicals and fertilisers, on the other hand, recorded sharp decreases. The decrease in the exports of industrial chemicals may be attributed partly to the diminished demands of certain consuming industries, particularly glass and textile.

In the fertiliser group unquestionably the nitrogen situation is of the utmost importance to the German chemical industry. With an estimated present capacity of over 1,165,000 metric tons of nitrogen, the German output totalled not more than 650,000 metric tons in 1930, approximately 500,000 of which were for home consumption. With a future outlook of a decrease in consumption, owing to the present world-wide depression in agricultural commodities, and with the failure of a renewal of the international nitrogen agreement, indications are that there will be no recovery in nitrogen exports during the current year.

Declines Recorded in United States

In value, the United States exports of chemicals during 1930 decreased 19 per cent. compared with 1929. Volume loss was considerably smaller, owing to the fall in commodity prices. Another factor which has affected United States exports has been the increased number of American chemical branch factories throughout the world, especially in Canada, which is the largest single market for American chemical products. A recent estimate placed the total number of such chemical branch factories at 308, with a total investment of approximately $138,000,000. In Europe there were 105 branch factories, with an investment of $58,000,000; in Canada, 113, with an investment of $45,000,000; in Latin America, 67, with an investment of $24,000,000; in Asia and Africa, 8, with an investment of $4,000,000; and in Australia and New Zealand, 15, with an investment of $8,000,000. The largest group of chemical branch factories is that of pharmaceutical products, in which the United States has 102 branch factories with a total investment of $35,000,000; second, toilet preparations, with 86 and involving an investment of $19,000,000; and third, paints and varnishes, with 32 branch factories representing an investment of $10,000,000.

During 1930 chemicals such as insecticides, pyroxylin products, benzol, superphosphates, and carbon black attained peak, shipments in quantity, while other chemicals such as lacquers, phosphate rock, borax, caustic soda, soda ash and dyes, maintained their positions. Although slightly smaller than in the previous year, exports of sulphur, rosin, turpentine, methanol, bleaching powders and dextrin were large.

British Chemical Exports

The 1930 British chemical exports made a relatively good showing, declining only 16.5 per cent. from those of 1929, while, on the other hand, total exports of all commodities declined 22 per cent. The disturbed conditions in the Far East, especially in India and China, undoubtedly affected the British chemical export trade. Another factor was the decline of chemical prices in Great Britain. In the exports of the industrial chemical group all items showed decreased values, while ammonium chloride, copper sulphate and some potassium compounds recorded increased quantities. In the coal-tar products, coal-tar increased almost 50 per cent. in value, while the quantity was almost doubled. Exports of benzol and toluol decreased to about one-fifth in quantity in comparison with shipments of the previous year, while naphthalene exports were larger in quantity but smaller in value. Exports of fertilisers decreased nearly 20 per cent. in value, but less than 4 per cent. in quantity. In the paint group all items except zinc oxide showed fairly large decreases in both quantity and value.

French Export Trade Generally Normal

During the past decade France has avoided over-production and thus minimised the necessity for intensive exports. It has, accordingly, only a regular and normal export trade in chemicals. The value of French chemical exports decreased only 9 per cent., the smallest decline recorded for the four major exporting countries. The 1930 chemical exports were maintained very well, and were nearly the same as for the years 1927 and 1928. During the first half of 1930, the French chemical trade was normal; however, during the second half of the year, there was a slight decrease, due mainly to the world depression. France continued to retain its foremost position as the world's leading exporter of toilet preparations, which accounted for approximately one-fifth of the total exports. In the fertiliser group, France takes second place, with exports of $28,000,000, and, although there was a decrease in the exports of potash, sales of superphosphate and basic slag held their position remarkably well. The medicinal preparations, which spread over a large number of items,, both of synthetic and natural origin, recorded a 14 per cent. decrease. There were slight decreases in shipments of coal-tar products, paints and varnishes, and natural products; on the other hand, there was a 40 per cent. increase in the explosive, plastics and match group.

Increasing Exports from Netherlands

Excluding Chile with its $75,000,000 chemical exportation, practically all of which was nitrate, the Netherlands is fifth and has recorded little change in exports during the past few years, with nearly $50,000,000 worth shipped abroad. Although preliminary figures indicate a slight decline in total chemical exports in 1930, to $47,400,000, the major chemical commodities—linseed oil, superphosphates, and ammonium sulphate—registered increases. Consideration, of course, must be given to the probable amounts of goods transshipped. It is well known, however, that the Netherlands possesses a large oil-seed-crushing industry, with exports of linseed oil comprising $11,700,000, or one quarter of the total. It also is a leader in the cinchona bark and quinine industry, owing to its possession of the cinchona industry in Java and its practical monopoly of these products, but exports of quinine sulphate declined to $2,000,000 in value in 1930. The effect of the two new ammonium-sulphate plants put in operation in 1930 was reflected in the increase in exports from $1,500,000 in 1929 to $3,500,000 in 1930.

Belgium exported chemicals and allied products to the value of $37,000,000, 42 per cent. of which consisted of fertilisers and 10 per cent. pigments. Italy shipped $30,000,000 worth and is second to the United States in world exports of sulphur but the leading exporter of citrus oils.

More than three-quarters of the $17,300,000 worth of chemicals shipped from Canada were destined for the United States and the United Kingdom, and both countries recorded appreciable declines in 1930 requirements. The United Kingdom, however, showed a greater loss, 32 per cent., while the United States took 27 per cent. less. Canada in both years sent 56 per cent. of its total exports to the United States. Fertilisers accounted for one-third of the total, cyanamide shipments worth $5,000,000 comprising the leading item. Japan, with its natural camphor, its peppermint oil and menthol, its pyroxylin, pyrethrum flowers, vegetable wax, and a few special medicinal and toilet preparations reaches a total of $21,500,000. Significant in Japan's trade is the marked decline in exports of matches, from $4,000,000 in 1927 to $1,500,000 in 1930. Matches account for two-thirds of the $20,000,000 export attributed to Sweden, and lac and shellac for two-thirds of the $23,000,000 shipment from British India. Other chemical-exporting countries in 1930 were: Czechoslovakia, $15,000,000; Spain, $7,800,000; Poland, $6,000,000; Yugoslavia, $3,800,000; and Australia, $3,400,000. In addition, Tunisia and Morocco are large exporters of phosphate rock but not of other chemicals.

Swiss Dyestuffs Position

Switzerland exported $30,000,000 worth of chemicals and is the second largest world exporter of coal-tar dyes, which accounted for nearly one-half of the total chemical exports, or $13,700,000, three-fourths of which were sold in European countries. Medicinal preparations, another leading item, showed a slight increase, to $3,800,000. Switzerland likewise is prominent in the world trade in synthetic aromatic materials.

Institution of Chemical Engineers

The 1931 Examination

THE report of the Board of Examiners on the 1931 Associate-Membership Examination contains the following passages:—

"The method of examination was exactly the same as in 1930, the general arrangement and choice of questions being on the same lines as in previous years.

"The examiners note a marked improvement in the quality of the answers to the 'Home' papers, some of the candidates having submitted fully detailed developments of the problems from first principles on the lines demanded. It is considered that the 'Home' papers have proved a most valuable test of the candidates' ability to tackle a practical problem, and although the labour involved in the preparation of the answers is considerable, it is felt that this method affords a better means of testing the candidates than could be secured in other ways.

"A slight improvement is noticeable in the drawings submitted by candidates, but still further improvement is looked for. It is considered that the answers to questions on materials of construction are still below the standard ultimately desired.

"A further improvement in methods of calculation and arrangement of work is noticeable, and the usefulness of a *viva voce* examination is confirmed."

Canadian Dumping Duty on United Kingdom Goods

ACCORDING to a telegram received from H. M. Senior Trade Commissioner in Montreal an Order-in-Council was issued on October 24 modifying the application of the dumping duty provisions to United Kingdom goods. The new Order-in-Council provides that the par value of £ sterling shall be 4.40 dollars and the special duty shall be the difference between the average value of the £ sterling as declared by the Department of National Revenue for a 15 day period (extending from the first to fifteenth day of each month and from the sixteenth day to the end of the month) and the fixed value of 4.40 dollars. The fixed value of 4.40 dollars for the £ sterling for special duty purposes shall prevail up to and including December 31, 1931 unless otherwise ordered by the competent authorities. The value of the £ sterling for other than special duty purposes shall remain at 4.86⅔ dollars as heretofore unless otherwise ordered. The Order-in-Council applies only to goods entitled to entry under the British preferential tariff.

B.B. Trade Mission to the Argentine

Lecture by Mr. John Benn

THERE was a very pleasant gathering in the Reception Hall at Bouverie House on Monday evening to hear a lecture on his experiences by Mr. John Benn, who recently visited the Buenos Aires British Trade Exhibition as representative of Benn Brothers, Ltd., and whose visit has resulted in the establishment of Benn Brothers' new monthly journal *Industria Britanica* for the promotion and development of British trade in the Argentine. The guests, who numbered about 200, were received by Mrs. Benn, who accompanied her husband on his tour, and were entertained to refreshments in the staff canteen.

Mr. Benn's lecture was liberally illustrated by lantern slides prepared from his own photographs, and these conveyed interesting impressions of the chief places of interest, the character of the country generally and its industrial centres, and the habits of the people. They included views of a large nitrate field, with machinery in operation for the preparation of the crude nitrate for the market. In his descriptive talk Mr. Benn indicated the immense opportunities for development presented by South America and emphasised the importance of British industrialists giving the closest attention to its present and potential markets.

Preparation of Rhenium Compounds

THE preparation of rhenium tetrachloride, and the rhenichlorides of potassium and silver, is described by Briscoe, Robinson, and Stoddart in the September number of the *Journal of the Chemical Society*. Precipitates of insoluble rhenichlorides were also obtained with mercurous and thallous salts. The primary product of treating the metal in chlorine is the tetrachloride, $ReCl_4$, which has not previously been observed. No evidence of the existence of the reported hexa- and hepta-chlorides was obtained, although the black crystalline tetra-chloride was always accompanied by traces of a brown, well-crystallised substance, melting sharply at about 21 deg., obtained in quantities insufficient for analysis. No evidence of the formation of a lower chloride was obtained when rhenium was treated in dry hydrogen chloride up to 900 deg., the metal being unattacked. Potassium rhenichloride, K_2ReCl_6, was obtained in green crystals by heating a mixture of rhenium and potassium chloride in chlorine and crystallising from cold water. The silver salt, Ag_2ReCl_6, was obtained as an orange precipitate on adding a slight excess of silver nitrate to an aqueous solution of potassium rhenichloride. It is not obviously crystalline. Preliminary experiments on the behaviour of metallic rhenium when heated with bromine and iodine confirmed the observations of Soddack: the products are regarded as tetrahalides.

Low Temperature Carbonisation of Canadian Coal

THE Mines Branch of the Dominion Department of Mines at Ottawa, has issued an advance copy of a report by R. A. Strong and E. J. Burrough, dealing with tests on Sydney Coal in the Illingworth low temperature carbonisation retort. The Chief of the Division of Fuels and Fuel Testing of the Mines Branch has made several trips of investigation in the United States, Great Britain and Europe, and has studied a number of the better known low-temperature carbonisation processes. One of these—the Illingworth process—has been tested at the Fuel Research Laboratories at Ottawa, and the Report under review records the data prepared by the chemists. A copy of this report can be consulted at the Reference Library, Canada House, Trafalgar Square, S.W.1.

Leunawerknitrogen Production

IT is reported that the production of ammonia at the German Leunawerk, the world's largest synthetic ammonia plant. was down to about 20 per cent. capacity early in August. A low production of around 300 tons nitrogen daily in the form of ammonia, ammonium sulphate and calcium nitrate by the Leunawerk is unprecedented. Furthermore there is no outlook for employing the idle equipment for other production. August. however, is normally a slow month in the nitrogen market, according to the United States Trade Commissioner at Berlin.

Mr. John F. Queeny

His Association with Graesser-Monsanto Chemical Works

MR. JOHN F. QUEENY, whose portrait we feature, founded the Monsanto Chemical Works, St. Louis, U.S.A., over 30 years ago, after a long experience in the chemical industry in all its branches. From the beginning he met overwhelming difficulties but built up a factory which was the beginning of the seven great plants and organisations in which he takes active interest at the present time. In this, he has been assisted over a long period by his son, Mr. E. M. Queeny, who is now President of the Company.

The Monsanto Company were associated for many years in this country with the Graesser-Monsanto Chemical Works, Ruabon, North Wales, which was founded in 1867, and it is only recently that Mr. Queeny bought out other interests and assumed personal control in London. From the moment of Mr. Queeny's arrival in this country, the Company experienced rapid expansion, beginning with the buying of a methyl salicylate business, a saccharin manufacturing concern, and later the tar works at Sunderland, Durham, formerly owned by Brotherton and Co., of Leeds. With the transfer of registered offices from Ruabon to London, the organisation was moved to their present suite of offices in Victoria Station House, S.W.1.

The combined interests manufacture a range of over two hundred products for the chemical and rubber industry and close scientific control of manufactured batches ensures a rigid standard of purity and uniformity being maintained. Mr. Queeny has filled every position from office boy to chairman of the Board, and to-day, at 72 years of age, he is actively engaged in planning further developments. He is keenly interested in the welfare of the hundreds of workers dependent on his employment, and at a recent social gathering held in London his message to the members of the Monsanto Organisation was to the effect that despite unsettled conditions and uncertainty in the industrial world, there would be no "pay cuts and no staff reduction." A dominating personality coupled with typical Irish charm, is the natural impression gained after a few moments interview.

Result of the General Election

Government Majority of Nearly 500

THE General Election has resulted in a crushing victory for the united National party. At the moment of going to press the Government have 551 members—Conservatives 470, National Labour 13, National Liberal 33, Liberal National (Simon Group) 31, Independent 4. The Opposition numbers 57—Labour 51, Liberals (Lloyd George Group) 5, Independent Labour 1, New Party and Communists 0. The aggregate vote was—for the Government 14,150,915; against 7,215,842.

Notable features of the election were the defeat of every Labour Cabinet Minister except Mr. Lansbury; the defeat of all the 36 women Labour candidates; the defeat of all the Moseley candidates and the loss of 21 deposits, and the defeat of all the Communist candidates and the loss of 20 deposits. Mr. J. H. Thomas headed the poll at Derby and Mr. MacDonald won with a big majority at Seaham.

Chemical Industry in the Election

The following candidates associated with the chemical industry were returned:—

Sir William Alexander, C. (Central Glasgow), majority 10,091.

Lieut.-Com. F. W. Astbury, C. (West Salford), majority 11,763.

Dr. G. C. Clayton, C. (Wirral, Division of Cheshire), majority 34,818.

Sir K. Vaughan-Morgan, C. (East Fulham), majority 14,521.

Major J. S. Courtauld, C. (Chichester), majority 37,671.

Sir W. Wayland, C. (Canterbury), majority 24,407.

Mr. Cyril Atkinson (Safeguarding Referee), C. (Altrincham), unopposed.

Mr. Clement Davies, K.C. (director of Lever Brothers), N. Lib. (Montgomeryshire), unopposed.

Captain G. K. Peto, C. (Bilston), majority 3,733.

Sir Basil Peto, C. (Barnstaple), majority 1,710.

Mr. G. le M. Mander, L. (East Wolverhampton), majority 2,317.

Sir W. Edge, N.L. (Bosworth), majority 14,256.

Extraction of Rotenone from Derris Root

Use of Carbon Tetrachloride

THE extraction of the insecticide, rotenone, from *Deguelia* (*Derris*) *sp.* root and cube root (*Lonchocarpus nicon*) is the subject of a preliminary report by Howard A. Jones, of the Insecticide Division, United States Bureau of Chemistry and Soils. Numerous solvents have been used in the extraction of these plant materials but for obtaining rotenone the majority of recent investigators have used ether, because of the readiness and purity with which, in general, rotenone separates from the evaporated ether extract.

Roark (*Soap*, 1931, No. 3., 97.) has outlined a method for the determination of rotenone in these roots. It consists in extracting the ground root in a Soxhlet apparatus with ether allowing the crystalline material to separate from the evaporated extract, and filtering and weighing this in a tared Gooch crucible. In a survey of numerous samples of *Deguelia* and cube roots, it has been found that in many cases in which this method was used the rotenone crystallised readily on standing overnight and filtered without difficulty. However, in some cases the rotenone separted from the extract only very slowly, and the gummy nature of the extract made filtration difficult. In other cases the separated crystalline material when examined under the microscope was found to contain only a small proportion of rotenone, or none. In an attempt to overcome some of these difficulties, carbon tetrachloride was substituted for ether in this method. This solvent was tried because its solvent power for rotenone is so nearly that of ether. Rotenone separates from solutions in carbon tetrachloride as solvent containing one molecule of the solvent to one of rotenone. This material can be dried in air and weighed, a factor being applied to obtain the equivalent weight of rotenone. It was also found that the rotenone separated from the evaporated carbon tetrachloride extracts of most roots more readily than from the corresponding ether extracts, and the amount of rotenone obtained by the use of the two solvents checked very well.

Large quantities of *Deguelia* root have also been successfully extracted with carbon tetrachloride for their rotenone content in the laboratory of the Bureau of Chemistry and Soils. The solvate obtained in these extractions may be freed of its carbon tetrachloride of crystallisation by recrystallising from alcohol. This may also be accomplished by heating at 80-90° under reduced pressure if convenient. The amount of carbon tetrachloride lost in this way is practically negligible, being only 39 per cent. of the weight of the recovered rotenone.

German Sulphur Imports

IMPORTS of sulphur into Germany during the first six months of 1931 were 42,893 metric tons compared with 32,628 for the same period of 1930 and 49,909 for 1929. During the first six months of 1931 the United States supplied 37,817 tons and Italy 4,474 tons.

Sulphur in Dutch East Indies

A LARGE percentage of the sulphur imported into the Dutch East Indies is consumed in the sugar industry. In 1930 the imports of sulphur into Java and Madura (according to the United States Vice Consul at Surabaya) were 11,528 metric tons valued at $440,000 compared with 12,166 metric tons valued at $470,000 for 1929 and 8,976 metric tons valued at $341,000 for 1927. During 1930, Italy was the largest source of supply with 10,076 metric tons while the imports from United States were 866 tons and those from Japan 554 tons.

From Week to Week

EARL BEAUCHAMP has found it necessary, owing to ill-health, to resign the Chancellorship of the University of London.

A MEMORIAL is to be erected at Muirkirk, on the site of his tar kilns, to John Louden M'Adam, the inventor of tar macadam.

THE REPORT OF I.G. FARBENINDUSTRIE (German Dye Trust) for the third quarter of the year shows no change in the general position. Foreign sales of fertilisers are stated to be on an improved scale.

IT IS ANNOUNCED FROM PARIS that the International Zinc Cartel has decided to cut production further by 5 per cent. with the object of speeding up the reduction of crude zinc stocks in order to bring them down to normal level.

THE NITROGEN WORKS of the Stickstoffwerke, Waldenburg, one of the group in which the Duke of Pless is interested, is to be opened shortly. The production is estimated at 20,000 to 25,000 tons annually.

THE COUNCIL OF THE SENATE of Cambridge University are recommending that the Goldsmiths' Readership in Metallurgy be discontinued, and that a Goldsmiths' Professorship in Metallurgy be established, the stipend of the Professorship being £1,200 a year.

THE QUEENSLAND GOVERNMENT is subsidising to the extent of £3,000 the re-erection of a plant for leaching copper ores by the Murdoch process. The interests concerned are erecting the plant at a cost of about £7,000. It is considered that by the Murdoch process low grade copper ore can be treated with profit with copper at £40 a ton. The ore to be taken from the Vulcan mine will average 5 per cent. copper per ton, and even at that low percentage will be treated with profit. By the new process only oxidised ores and carbonates can be treated and not sulphides.

PROPOSALS in connection with the amalgamation of two Scottish colliery companies, the Dalmellington Iron Co., Ltd., and William Baird and Co., Ltd., were accepted at an extraordinary general meeting of the former company in Glasgow, October 23. The amalgamation provides for the formation of a new company to be called Bairds and Dalmellington, Ltd. Sir William Bird, the chairman, who presided, pointed out that Bairds were by far the largest producers of coal in Ayrshire; Dalmellington came next. Both concerns sold to some extent in the same markets at competitive prices.

IN THE KING'S BENCH DIVISION on Monday, October 21, Mr. Justice Rowlatt gave judgment in an action brought by Bussey Coal Distillation Co., Regent Street, London, against Lord Verulam of Gorhambury for damages on alleged breach of duty. The plaintiffs averred that the defendant for his own purposes and without permission of the company arranged for the acquisition of Mount Vernon Colliery Co., with the object of supplying Glasgow with gas. Lord Verulam's defence was that, as managing director of Grimston Trust, Ltd., as agents for the plaintiffs, and with the plaintiff's consent, he entered into the negotiations to further the scheme in their common interest. Mr. Justice Rowlatt gave judgment for the plaintiff company for £2,100, with costs. There was no question of the defendant having done anything dishonourable. The only allegation was that he did not keep his co-directors cognisant of what was being negotiated.

THE MERCHANDISE MARKS COMMITTEE continued the hearing at the Board of Trade on Friday, October 20, of the application that imported zip or lightning fasteners should be required to bear an indication of their origin. Mr. T. W. Coventry, sales manager of Lightning Fasteners, Ltd. (a subsidiary company of Imperial Chemical Industries) said that zip fasteners business was developing tremendously. Imports of foreign fasteners had increased steadily during the last 18 months. One manufacturer of small purses used 40,000 ft. of slide fasteners a month, and he estimated that 200,000 ft. was imported every month. Major Reginald Ingram Marians, managing director of a firm importing foreign fasteners and exporting British leather and fibre goods, in giving evidence for the opposition, said that the zip fastener was only a component part of the article to which it was attached. They were anxious that the market for raw materials should be free.

THREE WORKMEN have been killed in a nitrogen factory at Trostberg, Lower Bavaria, by an escape of carbonic acid gas from a lime bunker.

WILLIAM MCPHAIL AND SONS, of Glasgow, founders and manufacturers of non-ferrous castings, have established a branch foundry in Vancouver, where operations commenced recently. The new concern is completely equipped to handle all types of copper, nickel, bronze and brass castings.

THE AUSTRALIAN PRODUCTION of sulphur from pyrites and other sulphide ores was 24,432 long tons for the fiscal year 1929-30. In that year imports of sulphur were 113,300 long tons valued at £540,000, compared with 80,870 tons worth £402,000 for the preceding year. The United States supplied practically the entire demand and Victoria, Western Australia, and New South Wales were the chief importing States.

THREE GARSTON MEN were injured by an explosion at the Speke Road works of the British Thermit Co., Garston, on Wednesday, October 21. They are George Farmer (46), works foreman; Harold Cave, and William Keenan. The men were engaged mixing chemicals ready for a furnace crucible when, without any warning, the mixture exploded. All three were rushed to Garston Hospital, where Cave died on Saturday. Keenan is still in a serious condition.

IT IS OFFICIALLY ANNOUNCED that an arrangement has been concluded between the principal producers of raw asbestos of the U.S.S.R. and Rhodesia with the purpose of meeting the difficulties existing on the asbestos market. This arrangement has been arrived at in collaboration with the principal consumers of Europe with a view to the stabilisation of the market on a basis satisfactory to all concerned. In consequence, supplies of raw asbestos, both Russian and Rhodesian, will in future be available for all buyers at favourable prices.

AN INTERNATIONAL ALUMINIUM CARTEL, with a share capital of 35,000,000 Swiss francs (£1,400,000 nominal) was formed at Basle on October 22 and includes French, British, German, Swiss and Canadian producers. It also possesses works in Norway. The object of the company, which has been named the Alliance Aluminium Co., Ltd., is to develop and extend the aluminium supply. In case of need, the capital may be increased to 65,000,000 Swiss francs (£2,600,000 nominal). The president is Major R. W. Cooper, chairman of the British Aluminium Co.

THE NORTH LONSDALE IRON AND STEEL CO., of Ulverston, has informed its shareholders that in the course of a few days they will receive an important communication, and until then they are strongly advised not to dispose of any part of their holding. The communication is understood to refer to the terms of amalgamation of the North Lonsdale company with a Cumberland iron and steel company. Between them they can produce 12,000 tons of iron weekly from their nine furnaces. The North Lonsdale Iron and Steel Company has an authorised capital of £300,000, in shares of £1, of which £246,827 has been subscribed and paid up, but no dividend has been paid for the past seven years.

Obituary

SIR THOMAS PAUL LATHAM at his home in Green Street, Park Lane, London, October 26, aged 76. Sir Thomas was a director of Courtaulds, Ltd., after being joint managing director for many years, and for a period, deputy chairman.

DR. SAMUEL W. STRATTON, president of the Massachusetts Institute of Technology, Boston, and who was director of the United States Bureau of Standards from 1901 until 1923, October 19, aged 70 years.

MR. C. J. S. FRASER, managing director in America for William Hollins & Co., of Nottingham (England). Mr. Fraser went to the United States from Scotland, where he spent five years in the Glasgow office of the W. Anderson Textile Manufacturing Co. He served as sales manager from 1901 to 1916, when he joined the British War Mission. From 1919 he was managing director of the American offices of W. Hollins & Co.

MR. J. R. WHITE, a well-known figure in the dyestuffs and chemical trade both in Yorkshire and in the Midlands, and proprietor of the firm of J. R. White & Co., Bradford, which firm is closely connected with M. G. White & Co., 160 Canal Road, Bradford, on October 17.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

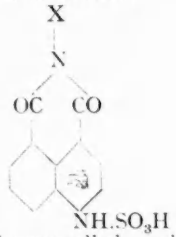
Abstracts of Accepted Specifications

352,076. DIBENZANTHRONES. Selden Co., McCartney Street, Pittsburg, U.S.A. (Assignees of L. C. Daniels, 313 Barr Avenue, Crafton, Pa., U.S.A.). International Convention date, April 4, 1929.

Dibenzanthrone is obtained by fusing benzanthrone with caustic potash in the presence of furfural or furfuryl alcohol, Isodibenzanthrone is obtained by fusing chlorbenzanthrone with caustic potash in the presence of furfural.

352,099. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 9, 1930. Addition to 304,739 (see THE CHEMICAL AGE, Vol. xx, p. 320).

Compounds of the general formula



where X represents hydrogen, alkyl, aryl, a hydroaromatic residue or a substituted or unsubstituted amino group are obtained by treating 4-sulphamino-1 : 8-naphthalic anhydride with ammonia, aliphatic, aromatic or hydroaromatic amines, hydroazine or a derivative. They dye esters or ethers of cellulose deep greenish-yellow shades.

352,133. VULCANISATION ACCELERATORS. Imperial Chemical Industries, Ltd., Millbank, London, and H. M. Bunbury, W. J. S. Naunton and W. A. Sexton, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 26, 1930.

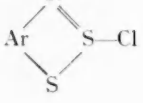
2-Mercapto-benzthiazole is condensed with chloranil in alcohol and the product is used to effect delayed action in the vulcanisation of rubber, acceleration only being rapid above 140° C. The product is particularly of use with an accelerator such as diphenyl-guanidine.

352,139. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 29, 1930. Addition to 299,721 (see THE CHEMICAL AGE, Vol. xx, p. 13).

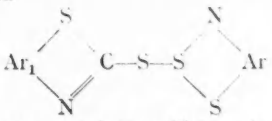
A sulphonic acid, aminosulphonic acid or sulphamic acid of naphthalic anhydride is treated with an amine of the hydroaromatic series or hydrazine compound containing at least one reactive hydrogen atom in an amino group. Alternatively, naphthalic anhydride or an amino derivative is treated with a hydroaromatic amine or hydrazine derivative as above, and the product converted into a sulphonic acid or sulphamic acid. The products are acid wool dyes. In an example, 4-amino-1 : 8-naphthalene dicarboxylic acid is sulphonated and the resulting 4-aminosulpho-1 : 8-naphthalic anhydride is treated with hydrazine hydrate, phenylhydrazine, cyclohexylamine or *p*-cyclohexylaniline.

352,165. VULCANISATION ACCELERATORS. Imperial Chemical Industries, Ltd., Millbank, London, and H. M. Bunbury, W. J. S. Naunton and W. A. Sexton, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, May 17, 1930.

Products for a similar purpose and having a similar effect to those of Specification 352,133 above, are obtained by condensing a 2-mercapto-arylene thiazole with a compound of the general formula



in which Ar is an aromatic residue. The products have the general formula



where Ar_1 represent *o*-arylene residues. An example is given.

352,176. ALIPHATIC ANHYDRIDES. G. B. Ellis, London. From C. F. Bochringer and Soehne Ges., Waldhof, Mannheim, Germany. Application date, May 22, 1930.

Diaceto-diethyl ether or analogous substance is heated with a catalyst such as hydrochloric or sulphuric acid, sulphur dioxide, zinc chloride or stannous chloride, but not substances of a basic nature. The above ethers are obtained by treating the aliphatic acid or its salt with the corresponding dichlorether. Examples are given of the application of the process to the production of acetic anhydride and propionic anhydride.

352,280. ACETYLENE, CARBON MONOXIDE AND HYDROGEN. Soc. d'Etudes Scientifiques et d'Entreprises Industrielles, Ougrée, Belgium. Assignees of E. Voituron, 260 Rue Ernest Solvay, Sclessin-Ougrée, Belgium. International Convention date, July 29, 1929. Addition to 349,067.

Gases containing a low proportion of saturated hydrocarbons, with or without hydrogen, are passed with steam and oxygen through a chamber heated above 1,300° C., yielding hydrogen, carbon monoxide and acetylene.

352,283. DYES. W. W. Groves, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 1, 1930. Addition to 334,878 and 334,920 (see THE CHEMICAL AGE, Vol. xxiii, p. 460).

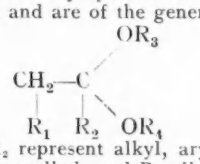
6 :6'-Diethoxy thioindigo is treated with a reducing agent other than a hydrosulphide in the presence of a smaller quantity of alkali than that used for preparing the vat of the dyestuff. The stable reduction products described in Specification 334,920 are obtained.

352,368. DYES. J. R. Geigy Akt.-Ges., 51 Riehenring, Basle, Switzerland. International Convention date, November 29, 1929.

These dyes are obtained by coupling the diazo compound of a disazo dyestuff $A-N=N-M_1-N=N-M_2-NH_2$ in which A is the residue of a benzene or naphthalene sulpho- or carboxylic acid and M_1 and M_2 are residues of α-naphthylamine or its 6- and/or 7-sulphonic acid, with a monoazo dyestuff amine → (acid) J-acid. Examples are given.

352,474. ACETALS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 4, 1930.

These acetals are employed as solvents or softening agents or in pharmacy, and are of the general formula



where R_1 and R_2 represent alkyl, aryl, aralkyl or hydrogen, R_3 alkyl, aryl or aralkyl, and R_4 alkyl, halogen-alkyl, cycloalkyl, aryl, aralkyl or unsaturated alkyl. They are obtained by treating organic hydroxy compounds containing more than 1 carbon atom and free from carboxylic groups, with vinyl ethers of the general formula $CHR_1 : CR_2.OR_3$ in the presence of acid reacting agents such as boron fluoride, sulphuric or phosphoric acid, thionyl chloride, acid salts or organic compounds capable of splitting off halogen hydracids, such as ethyl-(α-chlorethyl)-ether, neutral salts, or phenols. Elevated temperatures and pressures may be employed, and inert organic solvents or diluents may be present. Examples describe the preparation of acetaldehyde-ethyl-*n*-butyl acetal, acetaldehyde-ethyl-phenyl acetal, acetaldehyde-ethyl-2-chloroethyl acetal, symmetrical di-(acetaldehyde-ethyl)-1 : 2-ethylene acetal, and acetaldehyde-ethyl cholesteryl acetal.

352,512. FATTY ACIDS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 13, 1930.

Solid hydrocarbons are incompletely oxidised and the products separated from unchanged material, and the oxygenated substances separated from one another by centrifugal treatment. The acidic products may first be removed by saponification, and the unsaponified residue separated by centrifuging at different temperatures. In an example, oxidised products from paraffin wax are distilled and the acidic constituents of the distillates saponified. The unsaponified residue together with methanol is centrifuged at 15° C., yielding high molecular alcohols and ketones. The acids from the saponified fraction are centrifuged at 15° C. to obtain liquid acids similar to olein, and a solid fraction which is again fractionated at a higher temperature to obtain other acids.

352,537. HIGHER ALCOHOLS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 11, 1930.

The products from the destructive oxidation of difficultly volatile hydrocarbons in the liquid state with oxygen-containing gases are heated in the presence of hydrogen and a hydrogenation catalyst at 100°-250° C. and pressures of 10-300 atmospheres. The products are mainly higher aliphatic alcohols which may be separated by distillation, esterification, or selective solvents. Examples are given of the treatment of the products obtained by treating hard paraffin wax with air at 160° C., the products containing free carboxylic acids obtained by blowing paraffin oil at 160° C. with air in the presence of manganese naphthenate, and an oxidation product of soft paraffin wax from which free carboxylic acids have been removed.

352,585. CONCENTRATING ACIDS. Cellulose Acetate Silk Co., Ltd., Caton Road, Lancaster, and D. Hayes, 63 Borrowdale Road, Lancaster. Applications date, April 24, 1930.

Acetic acid is concentrated by distilling methylene chloride and allowing the condensate to separate into two layers. The methylene chloride is returned to the still until all water is removed.

352,652. PREVENTING OXIDATION OF OILS. Goodyear Tire and Rubber Co., 1144 East Market Street, Akron, Ohio, U.S.A. Assignees of A.M. Clifford, 1649 Honodle Street, Akron, Ohio, U.S.A. International Convention date, August 27, 1929.

The oxidation of transformer oils is prevented by adding a product obtained by dissolving molecular quantities of β-naphthol and aniline in the minimum of alcohol and adding formaldehyde. The product crystallises after standing. Similar products may be obtained by using *o*-toluidine or naphthyl-amines instead of aniline.

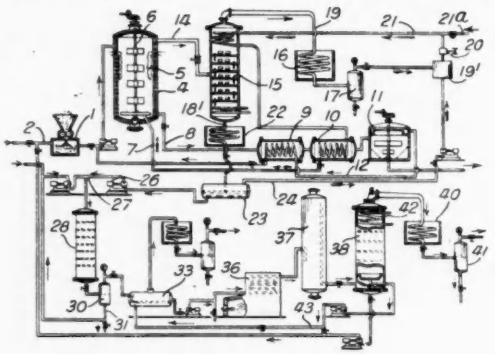
352,663. CATALYTIC HYDROGENATION OF AROMATIC COMPOUNDS. Boots Pure Drug Co., and J. Marshall, Station Street, Nottingham. Application date, May 28, 1930.

Eugenol, isoeugenol and their ortho-compounds are hydrogenated at 250°-270° C. with a copper catalyst, or 150°-170° C. with a nickel catalyst to obtain propyl-guaiacols. The catalysts are obtained by reducing copper oxide, nickel oxide, carbonate or formate with pure hydrogen at 200° C. Examples are given of the preparation of 4-*n*-propyl-guaiacol from eugenol and 6-*n*-propyl-guaiacol from *o*-eugenol.

352,672. DESTRUCTIVE HYDROGENATION. Standard Oil Development Co., Linden, N.J., U.S.A. Assignees of R. T. Haslem, 502 Alden Street, Westfield, N.J., U.S.A., and P. L. Young, 72 Barrow Street, New York. International Convention date, June 25, 1929.

Coal or other solid or semi-solid material is treated with hydrogen at 200 atmospheres and 600°-950° F. to produce an oil mainly boiling above 400° F., the phenolic and other impurities are removed by solvents such as aqueous alkaline solutions, glycol, glycerine, alcohol, acids, organic esters, or liquid sulphur dioxide, and the oil is then cracked to obtain low boiling hydrocarbons.

Coal is powdered in a mill 1, mixed with oil from a pipe 2, and then treated in a chamber 4 with hydrogen supplied by a pipe 7. The chamber is heated by electric heaters 5 and part of the material is continuously withdrawn by pipe 8 to heat exchangers 9, 10 and ash separator 11, and then returned by pipe 12. Gas passes to a rectifier 15 from which lighter condensate passes through pipe 19 to condenser 16, and separator 17. The gas passes on to purifier 19¹ and pipe



352,672

21 to the heat exchanger 10 and back to the pipe 7. Condensate from the rectifier passes through a cooler 22, and separator 23 and thence to a mixer 28 where it is treated with solvents to remove phenolic impurities. The purified oil passes through the vessel 33 to a cracking coil at 750°-1,100° F. and drum 37 and thence to a fractionating tower 38 where three fractions are obtained.

352,688. HYDROGEN AND CARBON BLACK.—Soc. Industrielle des Hydrocarbures et Derivés, 22 Rue de la Tremoille, Paris. Assignees of International Industrial and Chemical Co., Ltd., 120 St. James Street, Montreal, Canada. International Convention date, June 19, 1929.

Methane is treated at temperatures of 950°-2,000° C. at absolute or partial pressure varying from atmospheric at the lower limit to 25 mms. at the higher limit. The duration of heating decreases with the rise of temperature and the gases are continuously removed. The ratio of surface to volume of the apparatus varies from 3 : 1 at the lowest temperature to 30 : 1 at the highest temperature, e.g., 10 : 1 for a temperature of 1,500° C. A halogen or volatile halogen compound may be used as a catalyst, and the products are acetylene, ethylene, and carbon black.

352,725. TRIAMMONIUM PHOSPHATE. E. Urbain, 6 Rue Lyautey, Paris. International Convention date, May 8, 1930.

Ammonia is absorbed in phosphoric acid in an absorption tower until the first valency is completely saturated and the second valency partly saturated. The solution is then treated in a well-cooled apparatus of iron or steel with an excess of gaseous ammonia, and if the amount of water is suitably regulated, dry crystalline triammonium phosphate is obtained.

352,739. FERTILISERS. Imperial Chemical Industries, Ltd., Millbank, London. International Convention, July 15, 1929.

Phosphate rock is first treated with half the equivalent quantity of sulphuric acid to decompose any salts of volatile acids. Nitric acid is added after cooling, and a fertiliser containing calcium super-phosphate and calcium nitrate is obtained. Ammonium salts may also be added.

Specifications Accepted with date of Application

358,278. Recovery of fatty acids from the oxidation products of hydro-carbons. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). October 7, 1930.

358,295 and 358,301. Ammonium sulphate nitrate, Production of. Gewerkschaft Victor. October 15 and October 17, 1929.

358,328. Catalytically hydrogenating fatty acids. Henkel et Cie, Ges. December 23, 1929.

358,358. Separation of volatile substances from more difficultly Volatile substances, Apparatus for. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). December 4, 1930.

358,391. Carrying out distillations under low pressure, Process and apparatus for. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. February 27, 1930.

358,426. Vat dyestuffs and intermediates, Production of. R. F. Thomson, P. G. Carter, J. Thomas, and Imperial Chemical Industries, Ltd. June 4, 1930.

358,431. Sulphur dioxide, Methods of, and apparatus for treating. British Thomson-Houston Co., Ltd. July 1, 1929.

358,481. Furnaces for the reduction of iron oxides, and other iron compounds. M. Amoroso and Soc. Anon. Metalfer. July 3, 1929.
358,483. Azo dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). July 3, 1930.
358,477. Arylides of unsymmetrical ortho xylenol carboxylic acid. W. W. Groves (*I.G. Farbenindustrie Akt.-Ges.*). June 30, 1930.
358,491. Condensation products from polybasic acids and polyvalent alcohols, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). July 7, 1930.
358,492. Titanium dioxide, Manufacture of. W. W. Triggs. (*J. Blumenfeld.*) July 7, 1930.
358,495. High quality lubricating oils, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). May 29, 1930.
358,502. Valuable substitution products of the dibenzpyrenequinone series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 6, 1920. Addition to 324,964.
358,510. Derivatives of cellulose and other carbohydrates, Manufacture of. I.G. Farbenindustrie Akt.-Ges. May 8, 1929.
358,534. Polymerization products, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). May 6, 1930.
358,558. Gases containing sulphuretted hydrogen or containing sulphuretted hydrogen mixed with sulphur dioxide, Production of. J. Von Szombathy, K. Kell and P. Schmitz. July 8, 1929.
358,580. Sulphur, Production of. D. Tyrer and Imperial Chemical Industries, Ltd. July 11, 1930.
350,612. Solid salts of the higher molecular alkyl sulphuric acids, Production of. H. T. Böhme Akt.-Ges. August 22, 1929.
358,637. Magnesium ammonium phosphates poor in water contents, Manufacture of. Kali-Forschungs-Anstalt Ges. August 6, 1929. Addition to 329,495.
358,645. Lead sulphates containing lead oxide, Method of manufacturing. S. Negishi. August 7, 1930.
358,662. Destructive hydrogenation of carbonaceous materials in the liquid phase. H. Harper, R. Scott, and Imperial Chemical Industries, Ltd. August 26, 1930.
358,703. Chlorinated diaryls, Production of. Federal Phosphorus Co. September 28, 1929.
358,704. Non-crystalline high-chlorinated diaryl resins. Federal Phosphorus Co. September 28, 1929.
358,721. Organic compounds, Reduction of. H. T. Böhme Akt.-Ges. November 27, 1929. Addition to 20923/30.
358,728. Iodides of alkali metals or alkaline metals or alkaline earth metals, Preparation of. J. H. Van der Meulen. October 14, 1929.
358,745. Cyanates and cyanides of alkali metals, Manufacture of. H. Wittek. October 24, 1930.
358,756. Alkali phosphates from ferro-phosphorus compounds, Production of. Metallges Akt.-Ges. January 27, 1930.
358,794. Electrolytic manufacture of magnesium. A. C. Jessup. December 5, 1930.
358,831. Separation of acetic anhydride, acetic acid, and water, Process for. C. F. Boehringer & Soehne Ges. January 18, 1930.
358,850. Cooling the reaction zone and preventing explosions in the catalytic oxidation of ammonia, Process for. N. Caro and A. R. Frank. March 3, 1930.
358,851. Sulphur from gases, Method of recovering. S. I. Levy and C. Leaver. April 18, 1931.
358,852. 1-Aminoanthraquinone 2-sulphonic acid, Preparation of. Chemische Fabrik vorm. Sandoz. March 11, 1930.
358,863. Condensing arsenic-sulphur compounds from gases containing them, Process for. Patentaktiebolaget Grondal-Ramen. April 30, 1930.
358,869. Higher aliphatic alcohols, Production of. H. T. Böhme Akt.-Ges. July 18, 1930.
358,509. Derivatives of the dibenzpyrene-quinone series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 6, 1929. Addition to 325,222.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Acetex Safety Glass, Ltd., and Pollard, G. P. Manufacture of safety glass. 29451. October 23.
Aktis Akt.-Ges. Cracking heavy oils. 29546. October 24. (Germany, December 31, '30.)
American Tar Products Co., Inc. Apparatus for charging coke ovens. 29027. October 19. (United States, October 17, '30.)
Andrews, T. Forming nickel oxide. 29240. October 21.
Appareils et Evaporateurs Kestner. Concentration of nitric acid. 29144. October 20. (France, November 4, '30.)
Bideford Black, Ltd., and Schidrowitz, P. Treatment of mineral blacks. 29399. October 22.
Bloxam, A. G. (*Soc. of Chemical Industry in Basle*). Dyeing textiles. 29559. October 24.
British Celanese, Ltd. Manufacture &c. of artificial materials. 28977. October 19.
—— and Souter, P. F. C. Treatment of cellulose derivative materials. 28978. October 19.
—— Production of artificial filaments, films, &c. 29211. October 21. (United States, October 29, '30.)
Brown, J., and Courtaulds, Ltd. Manufacture of acetic anhydride. 29544. October 24.
Cellulose Acetate Silk Co., Ltd., Chaumeton, P. C., Curtis, H. C., and Tyrer, C. C. Manufacture of artificial silk. 29123. October 20.
Chemische Fabrik vorm. Sandoz. Preparation of crystalline glucosides from digitalis. 29248. October 21. (Germany, April 13.)
Deutsche Gold-und Silber-Scheideanstadt vorm. Roessler. Production of waterfree ethyl alcohol. 29343. October 22. (Germany, February 4.)
—— Production of anhydrous ethyl alcohol. 29344. October 22. (Germany, June 19.)
—— Production of water-free ethyl alcohol. 29345. October 22. (Germany, June 19.)
Dreyfus, H. Manufacture of organic compounds. 28974. October 19. (August 15, '30.)
—— Treatments for artificial filaments, etc. 28975. October 19.
—— Manufacture &c. of artificial filaments. 28976. October 19.
—— Manufacture of artificial silk, etc. 29212. October 21.
—— Production of organic compounds. 29348. October 22.
Edeleanu Ges. Thermal compression of gaseous sulphur dioxide. 29168. October 20. (Germany, October 20, '30.)
Eichengrün, A. Production of an uninflammable &c., solution of nitrocellulose. 29114. October 20. (Germany, October 20, '30.)
Fairweather, D. A. W. Dyes and dyeing. 29057. October 19.
Gasoline Products, Inc. Cracking hydrocarbons. 29258. October 21. (United States, October 21, '30.)
Groves, W. W. (*I.G. Farbenindustrie Akt.-Ges.*). Manufacture of artificial threads. 29464. October 23.
I.G. Farbenindustrie Akt.-Ges. Manufacture of water-resistant abradants. 29023. October 19. (Germany, October 18, '30.)
—— Improving taste and smell of fish oils. 29241. October 21. (Germany, October 21, '30.)
—— Magnesium alloys for production of castings. 29478. October 23. (Germany, November 11, '30.)
Imperial Chemical Industries, Ltd., and Salisbury, E. H. Production of nitrogen. 29167. October 20.
—— Light-producing ignitable compositions. 29281. October 21.
—— Manufacture of producer-gas. 29282. October 21.
—— Loveluck, R. J., and Thomson, R. F. Production of anthraquinone derivatives. 29287. October 22.
—— and Lawries, L. G. Delustering artificial silk. 29359. October 22.
—— and Piggott, H. A. Manufacture of dyestuffs &c. 29360. October 22.
—— Slider-operated separable fastener. 29361. October 22.
—— (*Hercules Powder Co.*). Impregnated materials, etc. 29283. October 21.
Johnson, J. Y. (*I.G. Farbenindustrie Akt.-Ges.*). Apparatus for manufacture of hydrocarbons. 28992. October 19.
—— Johnson, J. Y. Removal of carbon dioxide &c. from gases. 28993. October 19.
—— Johnson, J. Y. Separation of waste acids. 28994. October 19.
—— Mond, A. C. Agent for protecting animal fibres &c. October 19.
Lilienfeld, L. Manufacture of cellulose xanthate derivatives, and artificial materials therefrom. 29230. October 21. (August 11.)
Linch, F. W. Manufacture of dyestuffs &c. 29360. October 22.
Sheppard, S. R. Dyeing materials. 28913. October 17.
—— Manufacture of pigments. 28914. October 17.
—— Manufacture of colour lakes. 28915. October 17.
(Silica Gel Corporation). Tennant, W. J. Stills, &c. 28855. October 16.
Slater, V. W. and Weber, I. E. Manufacture of hydrogen peroxide. 18582. October 14.
Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 28581. October 14. (Switzerland, October 14, '30.)
—— Manufacture of dyestuffs. 28802. October 16. (Switzerland, October 18, '30.)
Triggs, W. W. (*Edeleanu Ges.*). Refining liquid hydrocarbons. 29218. October 21.
Wescott, E. W. Purification of sulphur. 28462, 28471. October 13.

New Standard for Vitamin B.

THE International Conference on Vitamin Units and Standards has adopted as the international standard preparation a method of preparing vitamin B concentrate devised by Atherton Seidell, of the United States Public Health Service. The report recommended that a batch of 25 kg. of the standard preparation be made and kept at the National Institute for Medical Research, London, acting for this purpose as a central laboratory on behalf of the Health Organisation of the League.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID, ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.

ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8½d. per lb., d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 19s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £15 10s. per ton; granulated, £14 10s. per ton; powder, £16 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.

CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 11d. to 2s. 4d. per gall.; pyridinised industrial, 2s. 1d. to 2s. 6d. per gall.; mineralised, 3s. to 3s. 4d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. net d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3⅜d. per lb. ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8½d. per lb. d/d U.K.

SALAMMONIAC.—First lmp, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.

SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77° E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS, CAKE, GRANULAR, AND POWDER.—3½d. per lb. net d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3⅜d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in drums. Crystals—Spot, £8 5s. per ton, d/d in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5¼d. to 6¼d. per lb. Crude 60's 1s. to 1s. 1d. per gall. August/December.

ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 3s. 6d. per gall. 97/99.—Refined, 1s. 11d. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.

ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.

BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

TOLUOLE.—90%, 1s. 9d. to 1s. 10d. per gall. Pure, 1s. 11d. to 2s. per gall.

XYLOL.—1s. 8d. to 1s. 9d. per gall. Pure, 1s. 11d. to 2s. per gall.

CREOSOTE.—Standard specification, for export, 4¾d. to 5d. net per gall. f.o.b.; for Home, 3¾d. per gall. d/d.

NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/190, 1s. to 1s. 5d. per gall.

NAPHTHALENE.—Purified Crystals, £10 per ton, in bags.

PITCH.—Medium soft, 60s.-65s. per ton, in bulk at makers' works.

PYRIDINE.—90/140, 3s. to 3s. 3d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID GAMMA.—Spot, 3s. 3d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

DINITROBENZENE.—7¾d. per lb.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d.-8d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyers' works.

NITRONAPHTHALENE.—8¾d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £6 10s. per ton. Grey, £11 to £13 per ton. Liquor, 7d. to 9d. per gall.

ACETIC ACID, TECHNICAL, 40%.—£15 15s. per ton.

ACETONE.—£63 to £65 per ton.

AMYL ACETATE, TECHNICAL.—85s. to 95s. per cwt.

CHARCOAL.—£6 10s. per ton, according to grade and locality.

IRON LIQUOR.—24°/30° Tw., 9d. to 1s. 2d. per gall.

METHYL ACETONE, 40/50%.—£43 per ton.

RED LIQUOR.—16° Tw., 7½d. to 9d. per gall.

WOOD CREOSOTE.—9d. to 1s. 6d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—1s. per gall. Solvent, 3s. 6d. to 4s. per gall.

WOOD TAR.—£1 10s. per ton.

BROWN SUGAR OF LEAD.—£30 to £32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.

BABYTES.—£7 to £8 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 3d. to 3s. 6d. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON, BLACK.—3½d. to 4½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—2s. 6d. per lb.

INDIARUBBER SUBSTITUTES, WHITE.—4d. to 5½d. per lb.; Dark, 4d. to 4½d. per lb.

LAMP BLACK.—£30 per ton.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£11 10s. to £15 15s. per ton.

MINERAL RUBBER "RUPRON."—£17.

PIPERIDINE RUBBER ACCELERATORS.—P.P.D., 10s. 6d. to 11s. 6d. per lb.; Z.P.D., 7s. to 7s. 6d. per lb.; L.P.D., 6s. 6d. to 7s. per lb.

SULPHUR CHLORINE.—4d. to 7d. per lb., according to quality.

SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.

SULPHUR PRECIP. COMMERCIAL.—£40 to £45 per ton.

VERMILION, PALE OR DEEP.—6s. 8d. to 6s. 10d. per lb.

ZINC SULPHUR.—10d. to 1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 4d. to 1s. 6d. per lb.

ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.

ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.

ACID, BENZOIC B.P.—1s. 10d. per lb., for synthetic product. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £34 per ton; powder, £35 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 0½d. per lb., less 5%.

ACID, GALLIC.—2s. 9d. per lb., for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—6d. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. for 28-lb. lots; Resublimed, 8s. 6d. per lb. for 28-lb. lots, d/d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 0½d. per lb., less 5%.

AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.

AMMONIUM BENZOATE.—3s. 6d. per lb.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—6s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—2s. 10d. per lb.

BISMUTH CARBONATE.—7s. 9d. per lb.

BISMUTH CITRATE.—9s. 2d. per lb.

BISMUTH SALICYLATE.—7s. 9d. per lb.

BISMUTH SUBNITRATE.—6s. 6d. per lb.

BISMU H NITRATE.—Cryst. 5s. 1d. per lb.

BISMUTH OXIDE.—11s. 1d. per lb.

BISMUTH SUBCHLORIDE.—10s. 9d. per lb.

BISMUTH SUBGALLATE.—7s. 4d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth sales respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W.Qts. 1s. 2d. per lb.; 6 W. Qts. 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts. 9½d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts., 9½d. per lb.

BORAX B.P.—Crystal, £23 10s. per ton; powder, £24 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

BROMIDES, B.P.—Ammonium, 1s. 7d. per lb.; potassium, 1s. 4d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s 6d. per lb. Prices for 1-cwt. lots.

CAFFEIN, PURE.—6s. 6d. per lb.

CAFFEIN CITRAS.—5s. per lb.

CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., according to quantity.

CAMPHOR.—Refined flowers, 3s. 2d. to 3s. 4d. per lb., transparent tablets, 3s. 5d. to 3s. 7d., according to quantity; also special contract prices.

CHLORAL HYDRATE.—2s. 11½d. to 3s. 1½d. per lb.

CHLOROFORM.—2s. 4d. per lb.

ETHERS.—S.G. .730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.

FORMALDEHYDE, 40%.—30s. per cwt. in barrels, ex wharf.

GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.

HEXAMINE.—1s. 10d. to 2s. per lb., according to quantity.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.

HYDROQUINONE.—4s. 7d. per lb. in 1-lb. lots; 3s. 5¾d. per lb. in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.

IRON AMMONIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 7d. per lb. list price.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz.

MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.

MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 15s. 6d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 9s. 9d. per lb., according to quantity; Liquid (95%), 8s. per lb.

MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 9s. 4d. to 9s. 5d. per lb., levig., 8s. 10d. to 8s. 11d. per lb.; Corrosive Sublimate, Lump, 7s. 5d. to 7s. 6d. per lb., Powder, 6s. 8d. to 6s. 9d. per lb.; White Precipitate, Lump, 7s. 5d. to 7s. 6d. per lb.; Powder, 7s. 6d. to 7s. 7d. per lb.; Calomel, 8s. to 8s. 1d. per lb.; Yellow Oxide, 8s. 7d. to 8s. 8d. per lb.; Persulph, B.P.C., 7s. 9d. to 7s. 10d. per lb.; Sulph. nig., 8s. 2d. to 8s. 3d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 3d. to 1s. 4d. per lb.

PARAFORMALDEHYDE.—1s. 6d. per lb.

PARALDEHYDE.—1s. 1d. per lb.

PHENACETIN.—3s. 9d. to 4s. 1d. per lb.

PHENOLPHTHALEIN.—5s. to 5s. 2½d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—90s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P., 1s. 7d. per lb. for 28-lb. lots.

POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.

POTASSIUM IODIDE.—B.P., 20s. 9d. to 23s. 9d. per lb., as to quantity.

POTASSIUM METABISULPHITE.—50s. per cwt. d/d London, kegs free.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.

SACCHARIN.—43s. 6d. per lb.

SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.

SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.

SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.

SODIUM BENZOATE B.P.—1s. 6d. to 1s. 7½d. per lb.

SODIUM CITRATE.—B.P.C. 1911, 1s. 4d. per lb. B.P.C. 1923, and U.S.P., 1s. 8d. per lb., for 28-lb. lots.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—73s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.

STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.

TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.

THYMOL.—Puriss, 6s. 1½d. to 7s. per lb., according to quantity. Natural, 12s. per lb.

ZINC STEARATE.—1s. 4d. to 1s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—8s. 9d. per lb.

AMYL ACETATE.—2s. 3d. per lb.

AMYL BUTYRATE.—4s. 9d. per lb.

AMYL CINNAMIC ALDEHYDE.—9s. 3d. per lb.

AMYL SALICYLATE.—2s. 6d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE ALCOHOL.—1s. 9d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.

BENZYL BENZOATE.—2s. 2d. per lb.

CINNAMIC ALDEHYDE NATURAL.—10s. 6d. per lb.

COUMARIN.—12s. per lb.

CITRONELLOL.—7s. 9d. per lb.

CITRAL.—6s. per lb.

ETHYL CINNAMATE.—8s. per lb.

ETHYL PHTHALATE.—2s. 6d. per lb.

EUGENOL.—7s. 6d. per lb.

GERANIOL.—7s. 3d. to 12s. per lb.

GERANIOL (FROM PALMAROSA).—17s. per lb.

HELIOTROPINE.—6s. per lb.

ISO EUGENOL.—9s. per lb.

LINALOL (EX BOIS DE ROSE).—5s. 6d. per lb.

LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.

METHY ANTHRANILATE.—7s. per lb.

METHYL BENZOATE.—4s. 3d. per lb.

MUSE XYLOL.—6s. 6d. per lb.

PHENYL ETHYL ACETATE.—10s. per lb.

PHENYL ETHYL ALCOHOL.—8s. 3d. per lb.

RHODINOL.—40s. per lb.

SAFROL.—2s. per lb.

VANILLIN, EX CLOVE OIL.—14s. 6d. to 16s. 6d. per lb. Ex Guaiacol.—13s. to 15s. per lb.

Essential Oils

ANISE OIL.—2s. 6d. per lb.

BERGAMOT OIL.—9s. 6d. per lb.

BOURBON GERANIUM OIL.—17s. 6d. per lb.

CAMPHOR OIL.—White, 90s. per cwt.; Brown, 90s. per cwt.

CANANGA.—Java, 7s. per lb.

CINNAMON OIL LEAF.—4s. per oz.

CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. Pure Ceylon, 2s. per lb.

CLOVE OIL, 90/92%.—6s. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 4d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 10s. per lb.

LEMON OIL.—4s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, October 31, 1931.

THE markets have received a moderate volume of inquiry during the past week with sellers still confining their offers to early delivery. Prices remain firm.

General Chemicals

ACETONE.—A fair volume of business has been placed and the market is firm at £62 per ton.

ACID, ACETIC.—Prices continue firm at £36 5s. to £38 5s. for Technical, and £37 5s. to £39 5s. per ton for Pure 80% with a brisk demand.

ACID, CITRIC.—Price unchanged at 1s. 1d. per lb. less 5% with a moderate volume of inquiry.

ACID, FORMIC.—Supplies are rather short for early delivery with the market firm at about £46 per ton and there is a brisk demand.

ACID, OXALIC.—Continues active at £42 to £43 per ton with the market strong.

ALUMINA SULPHATE.—Continues in good request with the market firm at £8 10s. to £9 10s. per ton.

ARSENIC.—Scarcity of Cornish material is still pronounced with the price firm at about £25 per ton f.o.r. Mines. Imported material is also firm at about £23 per ton c.i.f.

BARIUM CHLORIDE.—A brisk demand is being received with the market firm at £11 to £11 10s. per ton.

CREAM OF TARTAR.—In better request at 87s. to 90s. per cwt. less 2½%.

FORMALDEHYDE.—Continues to receive a steady demand with the market firm at £27 to £28 per ton.

LEAD ACETATE.—In better demand with White Quality quoted at £37 to £39 per ton with Brown £1 per ton less.

LITHOPHONE.—A firm market at about £22 per ton and in good request.

BICHROMATE OF POTASH.—Firm at 4¼d. per lb. and in good demand.

POTASH CHLORATE.—£32 to £34 per ton with a strong demand.

PERMANGANATE OF POTASH.—Is receiving a steady demand with the market firm at 6½d. to 6¾d. per lb.

POTASSIUM PRUSSIATE.—In short supply and the market is firm at about 8¼d. per lb.

SODIUM BICHROMATE.—A steady demand is being received with the price firm at 3½d. per lb.

SODIUM CHLORATE.—Continues active at £28/32 per ton.

SODIUM NITRATE.—In better demand at £20 to £22 per ton.

SODIUM PRUSSIATE.—Unchanged and with a firm demand at 4¾d. to 5¼d. per lb.

TARTAR EMETIC.—In steady demand at about 11. to 11½d. per lb.

ZINC SULPHATE.—Has been in moderate request with the market firm at about £11 to £12 per ton.

THE following additional market conditions are reported :—

CARBOLIC ACID.—There is no change to report, business is going through on a regular basis and there is a moderate amount of inquiry.

CRESYLIC ACID.—Brisk inquiry is noticeable in all directions; prices for home and export continue the same, but the tone is distinctly firm.

METHYL SALICYLATE.—Business passing through at new prices is well up to expectations and volume for the period of the year.

ASPIRIN.—Has been in good demand and buyers are taking advantage of the present prices which remain at 2s. 7d. to 2s. 9d. per lb.

VANILLIN.—Is steady at the price of 16s. to 18s. per lb. for Clove Oil material of British manufacture. Guaiacol Vanillin being quoted at 14s. 3d. to 16s. 3d. per lb., according to quantity.

Coal Tar Products

THERE is no alteration in the prices of coal tar products from last week, and the market still remains quiet.

MOTOR BENZOL.—Quoted at about 1s. 4¼d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 1½d. to 1s. 2d. per gallon f.o.r.

HEAVY NAPHTHA.—Unaltered, at about 11d. to 1s. 0½d. per gallon f.o.r.

CREOSOTE OIL.—Quoted at about 3d. to 3½d. per gallon f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Obtainable at about 1s. 6d. per gallon f.o.r. for 98/100% quality, and at about 1s. 4d. per gallon for the Dark quality 95/97%.

NAPHTHALENES.—Unchanged, at about £2 5s. to £2 10s. per ton for the firelighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Firmer, at 57s. 6d. to 60s. per ton, f.o.b. East Coast port.

Latest Oil Prices

LONDON, October 28.—LINSEED OIL was firm and 5s. to 7s. 6d. higher. Spot, ex mill, £18; November, £15 10s.; November-December, £15 15s.; January-April, £17 5s.; May-August, £18, naked. RAPE OIL was steady. Crude, extracted, £29 10s.; technical, refined, £31 10s., naked, ex wharf. COTTON OIL was steady, Egyptian crude, £22; refined common edible, £26; deodorised, £28, naked, ex mill. TURPENTINE was firm. American, spot, 52s. 6d. per cwt.

HULL.—LINSEED OIL, spot and October, closed at £16 10s.; November-December at £16 12s. 6d.; January-April at £17 5s.; and May-August at £18, naked. COTTON OIL.—Egyptian, crude, spot, £22 10s.; edible, refined, spot, £25; technical, spot, £24 15s.; deodorised, £27, naked. PALM KERNEL OIL.—Crude, naked, f.m.q., spot, £22 10s. GROUNDNUT OIL.—Crushed-extracted, spot, £30; deodorised, £34. SOYA OIL.—Crushed-extracted, spot, £20 10s.; deodorised, £24. RAPE OIL.—Crushed-extracted, spot, £29 10s.; refined, £31 10s. per ton. COD OIL, 17s. per cwt. TURPENTINE.—American, spot, 55s. per cwt. CASTOR OIL.—Pharmacy, spot, 48s. 6d.; firsts, 43s. 6d.; seconds, 41s. 6d. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—Prices remain steady at £5 5s. per ton f.o.b. U.K. port in single bags. *Home.*—There has been no change since the scale prices were announced in our last issue. It is understood that merchants are continuing to buy for the spring, and that in view of the much lower prices than last year it is generally anticipated that the consumption will show considerable expansion.

NITRATE OF SODA.—Since prices in the United Kingdom were withdrawn no further prices have been announced.

South Wales By-Products

THERE is slightly more activity in South Wales by-products. The call for pitch is slightly better, but not so good as was expected some weeks ago despite the fact that patent fuel business has improved. A good pitch demand, however, is expected from now onwards. There is no change in values. There is a fair call for refined tars, with values unchanged for coke-oven or gasworks tar. Road tar continues to have a steady, moderate call round about 13s. 6d. per 40-gallon barrel delivered. Naphthas are slow, both heavy and solvent being only in small, sporadic demand. Quotations are unchanged. Patent fuel quotations, for export, are :—19s. to 19s. 6d., ex-ship Cardiff; 18s. to 18s. 6d., ex-ship Swansea. Coke prices are :—Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 15s. 6d. to 17s.

Scottish Coal Tar Products

CRESYLIC ACID and water white products remains disappointing but other products are steady in tone with forward indications somewhat higher. Coal tar pitch is practically unobtainable in this area as distillers continue to produce refined tar.

Cresylic Acid.—Stocks are fairly high and no great demand exists. Prices are unchanged as follows :—Pale, 99/100 per cent., 1s. 5d. to 1s. 6d.; per gallon; pale, 97/99 per cent., 1s. 3d. to 1s. 4d. per gallon; dark, 97/99 per cent., 1s. 2d. to 1s. 3d. per gallon; all f.o.r. naked. High Boiling is scarce, however, with value steady at 2s. 9d. to 3s. 3d. per gallon.

Carbolic Sixties.—Supplies are not plentiful and value is round 1s. 5d. to 1s. 6d. per gallon according to water content.

Creosote Oil.—A fair volume of business has been placed during the week, but prices are unchanged. Specification Oils, 2¼d. to 3d. per gallon; washed oil, 3¼d. to 3¾d. per gallon; gas works ordinary, 3½d. to 3¾d. per gallon; all ex-makers' works in buyers' rail tank wagons.

Coal Tar Pitch.—Owing to the local scarcity export value is purely nominal at about 52s. 6d. to 55s. per ton f.o.b. Glasgow. Home orders now command 55s. to 57s. 6d. per ton ex makers' works in bulk.

Blast Furnace Pitch remains in moderate call at controlled prices of 35s. per ton f.o.r. works, and 40s. per ton f.a.s. Glasgow for export. Requirements are being satisfied ex stock.

Refined Coal Tar.—Prompt supplies are not now so difficult to obtain and value is 3¼d. to 3¾d. per gallon f.o.r. works in buyers' packages.

Blast Furnace Tar.—Nominal at 2¾d. per gallon.

Water White Products show little or no alteration there being very few orders although inquiries are quite numerous. Motor benzole, 1s. 3¼d. to 1s. 4¼d. per gallon; 90/160 Solvent, 1s. 2¼d. to 1s. 3¼d. per gallon; and 90/190 Heavy Solvent, 1s. 0¼d. to 1s. 1¼d. per gallon; all f.o.r. in buyers' rail tanks.

BROOMWADE

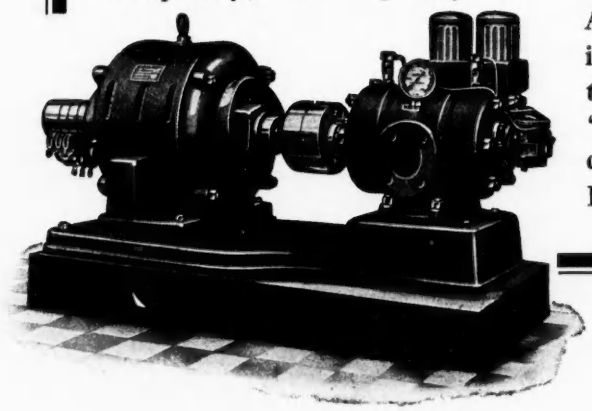
ROTARY COMPRESSORS & EXHAUSTERS

MANUFACTURED in a range of sizes from 6 to 1200 cubic feet per minute capacity, the "Broomwade" Rotary Machine is super-efficient, and its running speed and low starting torque enable it to be direct coupled to comparatively high speed squirrel-cage motors or other forms of driving units.

As a compressor for pressures from 4 to 40 lbs per square inch, or as an Exhauster with a vacuum reading within .23 of the barometer, this machine is pre-eminent in its class, whilst the rugged construction, simplicity, and quality of materials and workmanship are cardinal features which are strikingly apparent to the Plant Engineer.

Among this range there is a machine particularly suitable for your special needs—a machine capable of giving under the most arduous conditions a full measure of efficiency and reliability, and a machine embodying the results of 30 years' exhaustive effort in the design, manufacture and installation of Air Compressing Machinery.

The name "Broomwade" has become the standard by which Air Compressing Machinery is set; that is why Engineers the world over specify "Broomwade" when conditions call only for the Best Possible.



★

BUY BRITISH—BUY BEST
BUY BROOMWADE—BEST POSSIBLE

★

Catalogue "R" will gladly be sent upon request. It will be found both interesting and instructive.

BROOM & WADE LTD
HIGH WYCOMBE

D

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Chas. Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, October 27, 1931.

THE election is having its effect on the Scottish heavy chemical market, buying generally having come to a standstill. Export business continues to be brisk.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £25 per ton; crystals, £26 per ton; B.P. crystals, £34 per ton; B.P. powder, £35 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at £42 to £43 per ton, ex store.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality. £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton, c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station.

ANTIMONY OXIDE.—Spot material obtainable at round about £34 per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £25 10s. per ton, ex wharf. Spot material still on offer at £26 per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. to £11 10s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r works, or £4 12s. 6d. per ton, fo.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £38 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £42 to £44 per ton c.i.f. U.K. ports. Brown on offer at about £1 jer ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p., quoted 2s. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4½d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £26 10s. per ton ex store.

POTASSIUM CHLORATE, 99½/100% POWDER.—Quoted £26 15s. per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5½d. per lb. ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-toun lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Price not yet fixed.

SODIUM PRUSSIATE.—Quoted 5½d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £8 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Potash Production in Russia

IT is stated in the *Economic Review* of the Soviet Union that the Solikamsk potash mines in the Urals are now in partial operation, and this spring turned over to the collective farms 1,500 cars of crude fertilisers for use in the last sowing campaign. The grinding mill and power plant have been completed, and the concentration plant, warehouses, and other buildings are under way. Two shafts have been sunk and three potash beds reached up to six metres in thickness, two of which have a potassium chloride content of 20 to 35 per cent. The first mine is expected to produce 1,500,000 tons of potassium salts a year. This will be the largest potash mine in the world, with a capacity two and a half times that of the largest German mine. It will be in complete operation by the first quarter of next year. The construction of the second mine has already been started. A harbour is being built at Solikamsk on the Kama River, 250 kilometres above Perm, and this will relieve the railways, which are having difficulty in transporting potash to the points of consumption.

Fertilisers in Egypt

THE fertility of the Egyptian soil is undoubtedly due to the deposition of the Nile silt during the flood period. Prior to the inauguration, in 1890, of the Delta barrage, all the land in Egypt was irrigated under the basin system. Under this system the land was divided in a series of basins which were filled at high Nile. The water was allowed to remain in the basins for about 45 days during which the silt which is held in suspension in the waters was deposited. A necessary adjunct to the basin irrigation system was the "sharaqi" period, (sharaqi means land which receives no water during May, June and a part of July). The deposition of several centimetres of Nile silt and the sharaqi period rendered, in the past, the use of fertilisers unnecessary except for certain crops. Even then only animal manures were used. After the inauguration of the Delta barrage and the opening, in 1903, of the Assuan Dam, the irrigation system in the Delta was gradually changed from basin to perennial. With the discontinuing of basin irrigation the problem of maintaining the soil fertility and yields is becoming serious. In 1929 Egypt imported:—Sodium nitrate 193,125 long tons, Calcium 64,795 long tons, Superphosphates 60,532 long tons, Ammonium sulphate-nitrate 3,481 long tons, Ammonium sulphate 2,590 long tons, Cyanamide 1,662 long tons, Other fertilisers 1,680 long tons, Total 327,865 long tons. Until a few years ago all the chemical fertilisers used came from abroad; lately, however, an Egyptian company placed on sale, with relatively good success, a domestic brand of superphosphate.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, October 29, 1931.

Chemicals, like many other markets, have been largely overshadowed by the General Election this week, and whilst the direct result may not have been very marked business has certainly been subdued. The demand for imported chemicals has died off appreciably compared with about a month ago, but there is a fairly steady movement into consumption of most descriptions, as well as of the principal home-produced materials. The textile trades are more active and the demand for chemicals will probably improve as cotton and woollen trade orders recently booked reach the dyeing and finishing stages. It is too early yet to attempt to gauge the effect of the election result on chemical business, but there is more than a possibility that a renewal of buying interest in imported chemicals will be witnessed.

Heavy Chemicals

A moderate movement of bichromate of soda has been reported this week, with values well held at round 3½d. per lb. The demand for sulphide of sodium has been on quiet lines, but prices are firm in tendency at from £10 to £10 10s. per ton for the 60-65 per cent. concentrated solid quality and round £8 for the commercial. Bicarbonate of soda is fully maintained in the neighbourhood of £10 10s. per ton, in contracts, and a quietly steady demand for this material is reported. Caustic soda is moving off in fair quantities and prices are firm on the basis of £12 15s. to £14 per ton, in contracts, and according to grade. A moderate amount of inquiry is circulating in the case of prussiate of soda, quotations for which are at 4¾d. to 5¼d. per lb., according to quantity. Hyposulphite of soda meets with only a relatively quiet demand but offers are steady at round £15 5s. per ton for the photographic quality and £9 5s. for the commercial material. Chlorate of soda is quoted to-day at round £29 10s. per ton, with business on quiet lines. Phosphate of soda is firm at up to £13 per ton for the dibasic quality. Saltcake is steady at from £2 15s. to £3 per ton, with a fair tonnage moving. Alkali keeps firm at about £6 per ton and a fair inquiry is reported.

Yellow prussiate of potash is in moderate request, with current offers at from about 8¼d. to 8½d. per lb. Not a great deal of buying interest is being shown just now in chlorate of potash, offers of which are about £32 10s. per ton. Permanganate of potash meets with its usual quiet demand, with quotations maintained at the higher level of 6½d. per lb. for the B.P. grade and 6¼d. for the commercial. There is a moderate inquiry about in the case of bichromate of potash, which is well held at about 5½d. per lb. Caustic potash is in quietly steady demand at from £39 to £40 per ton, with carbonate of potash at about £28 10s. per ton.

The demand for sulphate of copper just now shows little indication of developing; values are much the same as before, round £18 10os. per ton, f.o.b., being indicated this week. There is a moderate inquiry for arsenic, with offers of foreign material quite steady at about £23 10s. per ton, ex store; business is passing in the lead products, with nitrate quoted at £29 per ton, and white and brown acetate at £33 10s. and £34 10s. The acetates of lime are attracting limited attention, with the brown quality on offer at £7 5s. per ton and the grey at from £12 to £12 10s.

Acids and Tar Products

Tartaric acid is in quiet request, with prices fairly steady at 1s. 0½d. per lb. Offers of citric acid show little change on balance at about 1s. 1½d. per lb. Acetic acid is in moderate demand and quotations are maintained at £38 5s. per ton for the commercial 80 per cent. grade, and round £51 for the technical glacial. Oxalic acid is moving in small lots on the basis of £2 2s. per cwt., ex store.

Among the by-products, pitch continues in active demand for export and prices are extremely firm at from £3 2s. 6d. to £3 7s. 6d. per ton., f.o.b. Sales of creosote oil are of moderate extent, with offers at from 3½d. to 4½d. per gallon, naked, according to quality. Solvent naphtha is firm at up to 1s. 4d. per gallon, naked. Crude carbolic acid is well held at up to 1s. 6½d. per gallon, naked, with crystals at round 6d. per lb., f.o.b.

Company News

E. I. du Pont de Nemours.—Net earnings of $1.11 per share, have been declared for the third quarter, against $1.05 a year ago.

Explosives and Chemical Products, Ltd.—A dividend of 16⅔ per cent., tax free, is announced on the ordinary shares, payable on October 24.

N. V. Van Bergh's Fabrieken.—An interim dividend on the (15 per cent. preferred) ordinary "A" shares will be payable, it is announced, on and after November 2, 1931.

Acetex Safety Glass Co.—The report for the year to June 30, 1931, shows a loss of £2,516, after charging adequate depreciation, law charges and expenses in connection with the negotiations for the sale of the foreign rights, amounting to £1,314.

Electrolytic Zinc Co. of Australasia.—The gross profits for the year to June 30 last, after placing £145,000 to depreciation reserve, amounted to £76,724, against £370,739 in the previous year. The net profit was £5,678, against £283,015, a reduction of £277,337. Adding the £1,322 brought in, £7,000 is left to go forward.

Burt, Boulton and Haywood, Ltd.—For the year ended June 300 last, there was a net profit of £51,933, to which is added £15,070 brought forward, making £67,003. The directors recommend a final dividend of 4 per cent., less tax, on the ordinary shares, and a final distribution on workers' certicates of £483, carrying forward £13,918.

North Broken Hill Co.—Operations for the year ended June 30 last show:—Profit and loss account credited with mine production, £484,962, and interest dividends, etc., £158,772, making £643,734. Deduct mines expenditure £480,643, administration, etc., £16,803, debenture interest £168, staff provident fund, £9,191, provision for taxes and royalties, £22,000, and reserve for depreciation, £30,000, making £558,805, and leaving £84.929 carried to appropriation account. To this amount add £442,189 brought forward, making £527,118, which has been appropriated thus: dividend No. 84, £26,250, debenture sinking fund £1,928, appropriation for plant expenditure, £20,000, leaving £478,940. Dividends paid during the year amounted to £61,250.

British Celanese, Ltd.—The accounts for the year to June 30, 1931, show that the balance of trading account amounted to £995,240, while the profit, before providing for interest and premium on redemption of first mortgage debenture stock and second mortgage bearer bonds; research and advertising; non-recurring and sundry charges; but after providing for general sales and administrative expenses, royalties and excise duty, amounted to £274,939. After allowing for debenture charges of £319,515, sundry charges (including certain items of a non-recurring nature) and adjustments to stock values at June 30, 1931, of £57,350, and research and advertising expenditure 1928-31, proportion written off and additions to patent rights during the year, written off, £172,699, there is a net loss of £274,625, against a net profit of £781,201 in the previous period. The balance brought forward was £229,490, out of which a dividend has been paid on the 7 per cent. first preference shares for the half-year to October 31, 1930, less tax, £54,250, leaving a loss to be carried forward of £90,385.

Belgium's Pharmaceutical Trade

Sales of medicinals and pharmaceuticals in Belgium have been little affected by the depression. There is general evidence that this industry is one of the more prosperous and successful industries at the present time, inasmuch as the spending of the public for remedies and alleviation does not seem to alter materially with business conditions.

Chief competition comes from local manufacturers and French, German and United Kingdom imports. No licenses to sell are required but the formula must be printed on the containers or labels. Labels and accompanying circulars must be printed in French and Flemish. Special regulations govern the kind of containers and labels to be used for medicines.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

ELEPHANT CHEMICAL CO., LTD., London, S.E. (M., 31/10/31.) Registered October 16, Land Registry charge (supplemental to two charges dated February 2, 1925) securing to Miss M. E. Harris, 173 Neate Street, Camberwell, £2,100 outstanding under said charges and any other moneys which become due to her; charged on properties in Coburg Road, Dalbiac Street and Neate Street, Camberwell. *£2,109. December 15, 1930.

ELVIN BROTHERS, LTD., Hull, soap makers. (M., 31/10/31.) Registered October 19, charge, to Midland Bank, Ltd., securing all moneys due or to become due to the bank; charged on land and buildings in Dansom Lane, Hull.

THOMSON BROS. (BIRKENHEAD), LTD., gelatine and glue manufacturers. (M., 31/10/31.) Registered October 13, mortgage and charge, to Midland Mank, Ltd., securing all moneys due or to become due to the bank; charged on property in New Chester Road, Tranmere, also general charge. *——. February 27, 1930.

WESTERN OXIDE AND PAINT CO., LTD., Plymouth. (M., 31/10/31.) Registered October 20, £2,500 first debenture, to Mrs. C. L. C. Adams, Applecroft, Meavy Bourne, Yelverton; general charge (subject, etc.).

New Companies Registered

COMMERCIAL LEAD, LTD., 4 Market Place, Kingston-on-Thames.—Registered October 23. Nominal capital £1,000 in £1 shares. To acquire certain patents for inventions relating to the manufacture and/or treatment of lead and its derivatives, and to carry on the business of manufacturers of lead pigments, paints; chemical manufacturers, etc.

CONSOLIDATED PLATINUMS, LTD., Imperial Chemical House, Millbank, London. Registered as a "private" company on October 21. Nominal capital, £1,000 in 10 shares of £100 each. The objects are to buy, sell, import, insure, handle, store, dispose of or otherwise deal, in the United Kingdom and elsewhere, in metals of the platinum group, namely platinum, palladium, rhodium, iridium, ruthenium and osmium, their alloys, ores, salts and compounds, and/or all matters, sludges, slimes, residues, concentrates and/or metalliferous substances and/or materials containing, producing and/or bearing all or any of the said metals; to promote co-operation between persons, firms and companies, including those who are or may become members and who alone or in co-partnership or otherwise carry on business as miners, smelters, producers, refiners, manufacturers, fabricators and/or dealers in or distributors of platinum metals, with a view to promoting the interests of its members on prudent commercial lines, to keep in touch with the progress made in the knowledge and practice of mining, refining, producing and treating platinum metals, with a view to promoting economy, efficiency and a high standard of quality, etc. Subscribers: Lord Brabourne, J. G. Lane, J. E. Janson, D. Owen Evans.

GOODWILL SEAWEED PRODUCTS, LTD., 33a St. Sepulchre Street, Scarborough.—Registered October 21. Nominal Capital £10,000 in £1 shares. Manufacturers, retailers, buying or selling agents of products made from seaweed or of which seaweed forms a component part, bath, skin and toilet soap and medicinal preparations of all kinds, chemicals, drugs, etc. Directors: F. Shoesmith, P. A. Menzies, C. E. Goodwill.

Tariff Changes

UNITED KINGDOM.—Under the provisions of Section 4 of the Finance (No. 2) Act, 1931, it is illegal for any person to mix hydrocarbon oils in respect of which a rebate of duty has been allowed under Section 2 (3) of the Finance Act, 1928, as amended, with any light hydrocarbon oils, unless he has been granted a licence by the Commissioners of Customs and Excise, and has before the mixing paid to the proper collector the amount of duty which would have been paid on the oil if the rebate had not been allowed. Any person who mixes hydrocarbon oils of the above descriptions without licence and payment of the duty, or who, if licensed, therefore contravenes the conditions attached to the licence, and is liable to Customs penalties. The effect of the prohibition is to make it illegal to mix any heavy hydrocarbon oil (such as kerosene or kerosene distillate), which has been delivered for home consumption on rebate, with petrol or other light hydrocarbon oil, unless a licence is first obtained and duty paid on the heavy oil. Applications for licences may be made at any Office of Customs and Excise.

FRANCE.—The import of nitrogenous fertilisers into France is subject to licence, but this requirement has hitherto been applied only to sulphate of ammonia, nitrate of soda, nitrate of lime and calcium cyanamide. A Decree of October 6, published in the French "Journal Officiel" of October 9, now extends the licensing requirement to apply to nitrate of potash, natural and transformed, phosphate of ammonia, nitrate of ammonia for industrial use, urea and compound or manufactured fertilisers containing more than 4 per cent. of inorganic nitrogen.

New Chemical Trade Marks

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

MANOX.

525,610. Class 1.—Chemical substances used in manufactures, photography, of philophosical research, and anti-corrosives, but not including chemical substances for use as a substitute for camphor in the manufacture of celluloid, and not including any goods of a like kind to any of these excluded goods. The Manchester Oxide Co., Ltd., Canal Street ,Miles Platting, Manchester; manufacturers. September 10, 1931.

BROXIL.

525,803. Class 1.—Cellulose lacquers. British Cellulose Lacquers Ltd., 5 Marshgate Lane, Stratford, London, E.15; manufacturers.—September 18, 1931.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

EGYPT.—The Department of Public Health is calling for tenders, to be presented in Cairo by December 29, 1931, for the supply of medicinal oils. (Ref. F.X. 1308.)

TURKEY.—The Ministry of Public Works is calling for tenders, to be presented in Turkey by November 9, 1931, for the supply of 2,000 tons of creosote. (Ref. F.X. 1306.)

"C.A." Query

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries:—

170. (*Plant*).—The names and addresses are required of firms supplying plant for the preparation of carbolic acid powder.